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20TH ANNIVERSARY

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MARCH 1995

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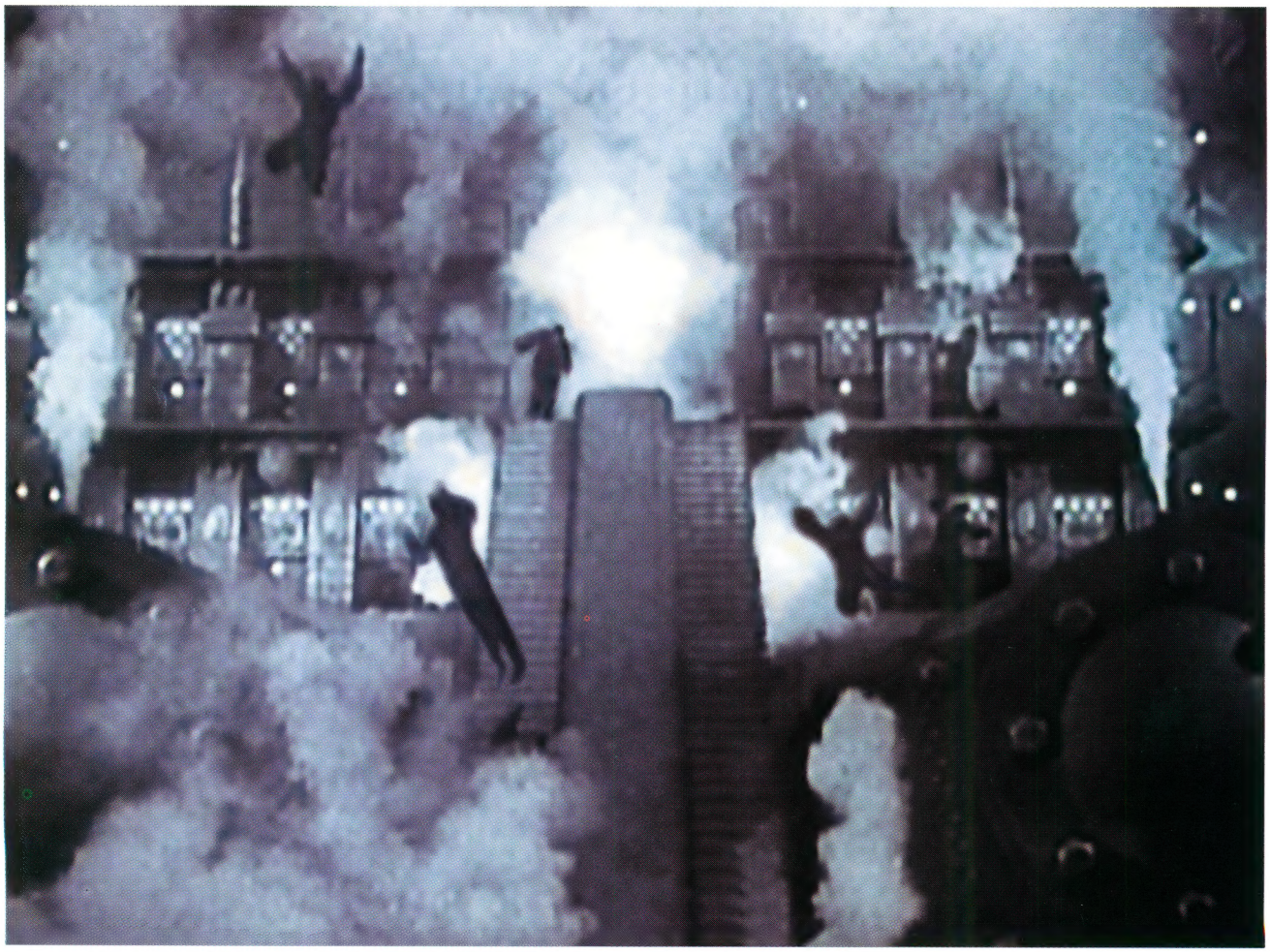
When creating an instrument of such concentrated power, a mishap now and then is inevitable.



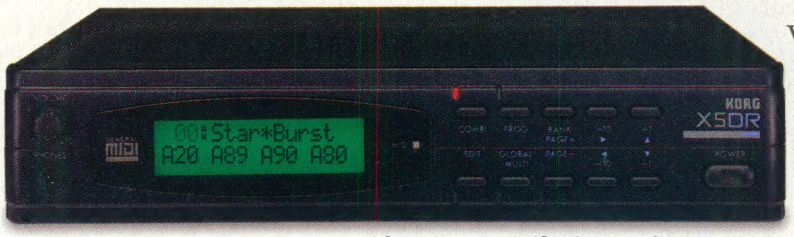
X5DR Miniaturization Project, Korg Power Plant, 1995.

The crater was a bit larger than we had anticipated. And our concrete walls may need a fresh coat of battleship gray.

But in 64 simultaneous voices, we now declare the latest Korg Power Plant project to be a raging success:

Presenting the new Korg X5DR.

Employing the latest miniaturization techniques, we found a way to put one of the world's most potent instruments inside a sound module that only takes up a half rack-space.



Behold: music power in its most concentrated form. In a mere half rack-space, the Korg X5DR sports 64-voice polyphony, the sounds of the X-Series, classic Korg sounds, 47 effects and more.

Despite its unassuming size, the X5DR contains a warehouse-full of Korg's most wanted sounds. We started with the X-Series ROM, then added our favorite sounds from the M1, 01/W, T-Series, Wavestation and PCM card libraries. And, taking advantage of its expanded 8MB of PCM memory, we were able to add 100 new programs and combinations, as well as 128 General MIDI programs.

That means you can play the X5DR like an X5DR – with its brand-new set of Korg-quality sounds. Or, by simply pressing a button, you can access the X5 and 05R/W factory presets.

And we added more. Like 64-voice polyphony, so you can sequence and layer to your heart's content. Plus 47 effect algorithms that you can control in real time. And a built-in interface that allows you to connect the X5DR directly to a computer.

Not that any of this should surprise you, considering the X family history.

The Korg X2 and X3 Power Music Workstations™ have become a way of life on stages and in studios all over the world. The X5 has made the sound and performance of the X family (minus the disk drive and sequencer) available at a surprisingly affordable price. And the X3R has packed all the features of the X3 keyboard into one very neat rack-mount module.

Now that the Korg X5DR has been certified for civilian use, go hear one at your nearest authorized Korg dealer.

It's pure. It's concentrated. And be forewarned: In the right hands, it can be absolutely explosive.

We're miniaturizing prices as well. The Korg X5 is pure X for less than $1100.

KORG®

The power company.™

contents

26 THOMAS DOLBY

Features

26 THOMAS DOLBY

The evolution of modern music is reflected in Dolby's career. Rock star frippery and concert excesses are already memories as this multifaceted composer, keyboardist, and multimedia artist discusses his score for *The Gate to the Mind's Eye* and imagines unprecedented adventures in interactivity just over the horizon.

38 REMEMBERING VINTAGE RMI

If you're planning a pilgrimage to the birthplace of digital music technology, head toward Macungie, Pennsylvania, where a group of church organists launched the revolution 25 years ago. *Keyboard* visits the wizards behind Rocky Mount Instruments, and test-drives the classic RMI Keyboard Computer II.

48 12 WHO COUNT: BRIAN ENO

Ambient composition, sonic collage, synthesizer design, the most basic assumptions of what music is: There's hardly an area in our world that Eno hasn't affected. One of the most provocative thinkers in modern pop assesses the state of our art and shares a surprising vision of its future.

60 HOT TIPS: ROLAND'S JV SERIES

This voyage through the architecture of the JV-80, -90, and -1000 goes way beyond presets to explore layering and routing techniques, ways to edit sounds during live performance, and other applications you might have missed.

65 GIVEAWAY

Win a desktop music station featuring Musicator's Win 2.0 integrated sequencing and notation software for Windows, a Mackie CR-1604 mixer, Roland's SC-33 Sound Canvas, a Fatar CMS-61 keyboard controller, and plenty more hot products — a total value of $6,900!

100 *KEYBOARD* READER POLL

You pick the top players and products of '94 — and the past 20 years!

60 HOT TIPS

COVER PHOTO: **WILLIAM HAMES**

KEYBOARD®
VOL. 21
NO. 3 (ISSUE #227)
MARCH 1995

Departments & Columns

6 LETTERS

12 WORLD VIEW
Derek Sherinian hits the road with Dream Theater. Mixmaster Morris says chill's the thrill in ambient techno. Plus, a look beneath the mask at the Power Rangers' musical mastermind.

18 INTERFACE
CD-ROM theory lessons from Oscar Peterson. Straight talk on the Pentium panic from the Lauriston Report. New products for pianists. And bulletins on the latest sizzlin' gear in the stores or on the way.

103 DIGITAL HOME RECORDING
Craig Anderton solves the mystery of how to add punch to samples.

106 MUSICMEDIA
Bob Safir stands up for old-fashioned linear approaches in scoring for video.

111 INSIDE THE MUSIC
Dave Stewart brews up a kettle of Sleepytime tea and sinks into the abyss of reader dreams.

115 REEL WORLD
Jeff Rona outlines the method behind his music on a typical episode of *Chicago Hope*.

118 SOLO PIANO
Fred Hersch stretches the harmonic web further over "Body and Soul."

123 COMPOSING
Richard Leiter goes back in time and down the Mississippi for *Maggie's American Dream*.

131 DISCOVERIES

137 CLASSIFIED ADS

143 ADVERTISER INDEX

144 CREATIVE OPTIONS
Connor Freff Cochran finds redemption in his father's legacy.

Keyboard Reports

72 KORG WAVEDRUM
DSP-based percussion synth.

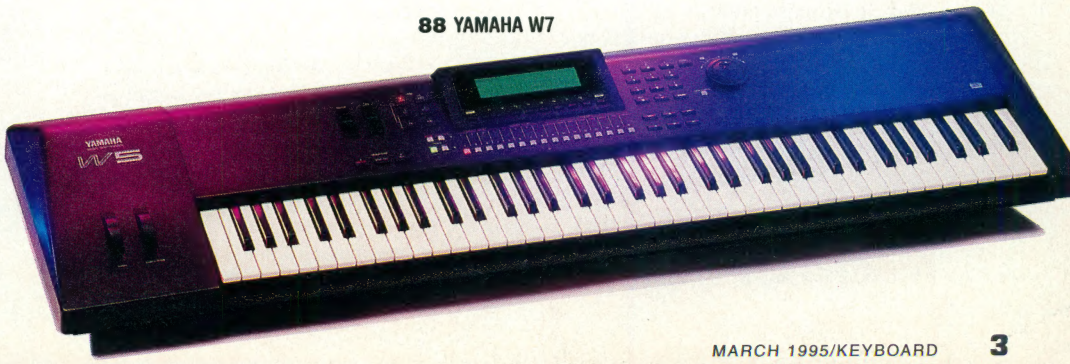
79 TURTLE BEACH QUAD STUDIO
Multitrack hard disk recording system for PC.

88 YAMAHA W7
Synth/sequencer workstation.

97 SOUNDS
Bashiri Johnson's Supreme Beats, Northstar K2000 CD-ROM.

72 KORG WAVEDRUM

88 YAMAHA W7



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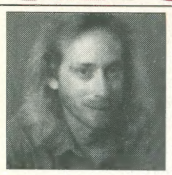

DOMINIC MILANO

Labs? We don't need no stinking labs!

A very wise man once said sane people do not attend conventions. At least not if they know better and aren't being paid for it. My sanity is questioned on a regular basis, but as luck would have it, I do get paid to go to trade shows. So of late, I've been doing the computer gizmo and geegaw circuit representing *Keyboard* and *InterActivity*, magazines that until recently shared the same editor. Actually, a bunch of the same editors, but that's another story.

InterActivity is the new baby on the block, so the power schmoozing that goes on about it is very different from typical *Keyboard* insider babble. Perhaps the most often asked question about *InterActivity*, when computer industry movers and shakers hear that we're doing product reviews, is, "Oh, do you have a test lab?"

OF course, they're thinking the only way to do reviews is to have a multi-million dollar facility *à la* MacUser Labs, PC Labs, Byte Labs, and like that. What I tell them is the same thing I've been telling people about *Keyboard*'s review facilities for ages: Computers we've got. Megabucks testing gear, ditto. An on-site recording studio, we're building. Off-site project studios, many of us use/borrow/own. But when you get right down to it, we don't need no stinking lab to review tools made for making music.

For that kind of testing, you need people who understand the gear and how to make music with it. And yeah, the pile of resources (a.k.a. lab gear) we've got lying around helps too. But without a staff of musicians to put the instruments and software and accessories being reviewed through their paces, the lab's just a bunch of high-tech junk.

Fortunately, musicians we've got. Aikin, Darter, Doerschuk, Marans, Vail, Rideout, and Rule are all active musicians in one way or another. Aikin recorded his CD for Linden Music in his home studio. Doerschuk does solo piano four or five nights a week, including Friday nights at San Francisco's prestigious Washington Street Bar & Grill. Marans runs a very active project studio. Vail's passion is improvisational instrumental playing. Rideout gigs regularly with jazz and rock 'n' roll bands and tours occasionally with an early music ensemble. Rule's our resident electronic and acoustic drummer; his band has toured Finland, of all places, several times. Even intern Mark Grey, a composer, synthesist, and guitarist by trade, is touring Europe later this year as assistant to *Nixon in China* composer John Adams. And Darter, well, we'll get to him in a second. . . .

When we need other opinions, we don't mess around — we've had the likes of Tom Coster, Merl Saunders, and Roger Powell share their opinions with us on everything from digital pianos to Hammond organs. This month, Greg brought in Santana's extraordinary percussionist Karl Perazzo to bang on Korg's first synth based on physical modeling technology, the Wavedrum.

. . . Now about Darter. Once upon a time he was a hotshot composition student at Cornell. He studied with Karel Husa, Elliott Carter, Robert Palmer, and Aaron Copland. Taught composition and theory at Chicago's Roosevelt University. Ran an avant-garde Contemporary Music Ensemble. Led an experimental jazz trio (flute, Rhodes, bass guitar). Wrote a theory column for *Guitar Player* prior to getting hired as *Keyboard*'s founding editor and in turn hiring one of his students (a.k.a. yours truly) as his assistant. Eight or ten years, a couple of bands, a doctorate in music, and a jazz album or two later, Doc won acclaim arranging the Kronos String Quartet's album of Thelonious Monk tunes.

Somewhere along the way, Tom became GPI's "director of publications" and I became *Keyboard*'s editor. Then, following up on a lifelong goal, he left *Keyboard* to pursue a career playing film dates in Hollywood, which led to synth performances on a bunch of sessions, including *Pretty in Pink* and Jerry Goldsmith's *Inner Space, Russia House, Sleeping with the Enemy, Gremlins II,* and *Star Trek V*.

Tom rejoined the Chain Gang at *Keyboard* Central a couple years ago when Jim Aikin left his post as managing editor to write one of his science fiction novels, *The Wall at the Edge of the World* (Ace Books). Around the same time, I became the GPI Group's editorial director, overseeing the editorial staffs of *Keyboard, Guitar Player, Best of Guitar Player, Vintage Gallery,* lending my two cents to the self-sufficient staff of *Bass Player*.

Oddly enough, my gig isn't much different from Darter's when he was director of publications. And far be it from me to mess with symmetry. Tom was editor of *Keyboard* for ten years. I've been editor of *Keyboard* for ten years. But I'm also the editor of *InterActivity*, and with all the other stuff I do around here, it's time to make my life just slightly more sane by passing the torch back to Tom, who as of this issue is *Keyboard*'s editor once again.

Megalomania runs strong in my family, though, so I'll still be hanging around *Keyboard* Central, working with Tom on the overall direction and content of this baby we birthed together 20 years ago. And, yeah, I'm going to keep scribbling this column, just cuz it makes the Chain Gang nuts when I routinely turn it in at the absolute last second.

How do I get away with it? What can I say? I attend a lot of conventions. ■

KEYBOARD

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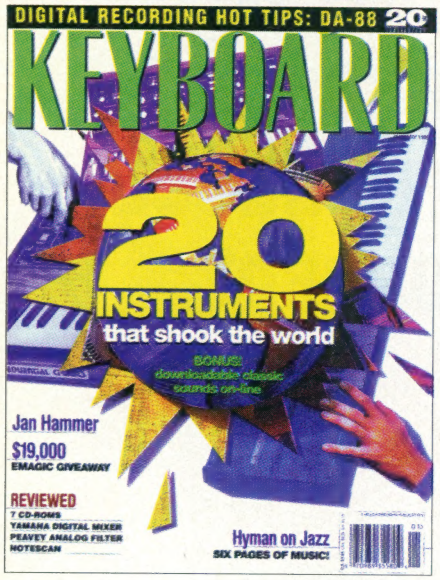

Twenty Killer Keys

Before all the "vintage haters" send in their complaints, I want to let you know how much I enjoyed your cover story on "20 Instruments That Shook the World" [Jan. '95]. Maybe you had to work a little harder to get a good sound out of those dinosaurs, but I've had nothing but fun programming an old Jupiter-8 that I recently bought. Although it sounded a little dry at first, after a while I started getting sounds from it that were truly musical — and truly mine! I highly recommend that anyone who feels burned out on MIDI find an old keyboard instrument and get to know it a little, or a lot.

S.P.
Los Angeles, CA

Your article on the 20 most influential keyboards was interesting and entertaining. I also found it incomplete and riddled with minor errors.

Let's start with what you left out: (1) The E-mu Proteus. Just try to find a grade-B film, jingle, or porno flick from the '80s without its sounds. (2) The Yamaha CP-70. This ingenious instrument made it possible to take an *almost* real piano on the road. Plus it was a way-cool stand for our Prophets. (3) The Rhodes Chroma. Motorola processor, 16 voices, SCSI interface, wooden weighted keys with aftertouch, complete architectural algorithms, sequencer, *totally* programmable controllers — all in 1981. Need I say more? (4) The Korg Poly Six. First cheap poly synth with memory that actually worked. (Remember, a synth need not have two oscillators per key to be a real synth.) (5) The ARP Odyssey. Moog's only competition. Dual stable oscillators, duophonic, CV interface, and easy to use live.

Honorable mentions: (6) The Univox Stringman. Used by Gino Vanelli, Paul McCartney, and Elton John; also foreshadowed the ARP String Ensemble. (7) The RMI KC-II. First digital poly synth. (8) The Synclavier. The benchmark sampler/workstation. (9) The Alpha Syntauri. First affordable digital synth for your Mac, with Fourier analysis and real FM. (10) The Synergy. Cartridge-based, 32-digital oscillator, 16-bit sample-playback synth, from 1979. (11) The Oberheim Xpander. If you have to ask why, you'll never know. (12) The Vox Jaguar. Ultra-cool through a fuzz/wah and a Silvertone.

You failed to mention that Sequential's Prophet-5 had an interface that wired much more easily than the current 5-pin MIDI connection, with only three pins. It could also be tricked into doing poly portamento, but I won't tell anyone how. The E-mu Emulator II was much more of an influence than the first and more closely related to the Fairlight in general architecture. Finally, sorry, Virginia, but the Korg Wavestation does have drums. Check factory bank RAM 3, patch 7, oddly enough called "Drums." Though you might think of sequencing as strictly an event-entering process, the major point of the Wavestation *is* its ability to sequence pre-sampled waveforms. These wave sequences can then be externally controlled by clocks. Got it?

Plex Barnhart
New York, NY

[*RAM 3? Our author owns one of the original Wavestations, which only had two RAM banks — and no drums. Also no drum kit programming, which is what was mentioned in the article.*]

Outstanding article! It's a shame that analog synths aren't produced as much as they used to be. I miss having complete and easy control for editing, as well as true analog sound. I currently use a Yamaha SY85 and TG100 and a Roland JV-90, but I get the most enjoyment from my Juno-106. Let's hope that analog synths can come back.

Mike Naus, Jr.
Houston, TX

Your "20 Instruments" article epitomizes what's bothered me about *Keyboard* for years: cliquishness, exaggeration, inconsistency, and simply not knowing your facts. You write, "The Minimoog was a pig." A pig to the extent that "you couldn't play chords on it" and it had no memory? Well, *duh!* At that time, which commercially available synth *could* you play chords and store patches on? But despite these slovenly limitations, a lot of great music was produced on them.

Why did you call the M1's sequencer "lame" in your original review and "excellent" in this article? And what's this bit about digital noise coming from the M1? True, you'll get some digital crunch if you overload the output by having the oscillator levels too high, but that's not unlike what the Proteus or K2000 will do under similar circumstances. Roland may not have reissued the TR-808, but they did issue an "electronic" soundcard for the R-8 which contains all the definitive 808 sounds. Also, the Wavestation can receive multitimbrally on 16 channels, not eight.

Finally, how can you say that "real people" don't design instruments anymore and then talk about a "design team" in the same sentence? What bothers me more than this contradiction is the feeling that you are furthering the perception that people are no longer in control of or responsible for the products of technology, or technology itself! Ultimately, human beings conceive of, design, produce, and market musical instruments and every other technology. I've had the privilege of being on design teams for several prominent synthesizer manufacturers, and believe me when I tell you that the production of a new synthesizer, albeit by a corporation, is very much a creative endeavor. How would *any* synthesizer end up sounding even remotely cool if it weren't for the creativity of the musicians and technicians behind it?

Peter "Ski" Schwartz
Queens, NY

Great job on the "20 Instruments" article. Being the owner of a Minimoog and the former owner of an M1 and D-50, I was impressed with your to-the-point analysis of these incredible 'boards. It's amazing how the M1 still holds its own on the used market. This proves that even as technology progresses, we still go back to the sources of why innovation happens at all.

Alexander M. Sharivker
Brooklyn, NY

I'd like to share some thoughts about an instrument that didn't make it into your otherwise great article: the RMI Harpsichord. Even if it didn't shake the world, at least, in my opinion, it shook Philly.

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of the psychedelic era (1966-'67). It was a happenin' scene, and there were quite a few venues where an under-21er could see great acts. Once I went to my favorite spot, The Trauma, on Arch Street to hear Strawberry Alarm Clock or Moby Grape, I've forgotten which. The warmup act was the Mandrake Memorial, and it took about four bars into the first song for my socks to get knocked so far off that my feet started shivering. The guitarist was Craig Anderton — yes, *the* Craig Anderton. But the real story was Michael Kac and his RMI Harpsichord. He had a Baroque approach that was perfect for the instrument. He'd rip through perfectly executed solos that Bach would have envied. More intensity came from his hands and the RMI than from entire bands gigging around Philly.

The RMI Harpsichord, like Mandrake, was too unique to garner wide popularity. It fit wonderfully into a world that encouraged musical experimentation. Yet ultimately it didn't fit the needs of mass media pop tunes. As Chick Corea said in his comments about a sister instrument, the RMI Piano, the keyboard felt too much like that of an electric organ to let a piano player really get into it. Harpsichords don't respond to dynamic variations the way pianos do. Maybe that's why RMIs worked well as harpsichords. Although it's possible to get good harpsichord sounds from digital synths and sample-playback instruments, there's still something special about that RMI sound.

Ed Kosmahl
Internet

Although I have a "real day job" as an attorney, I spend a lot of my evenings and weekends as a keyboardist/recording engineer in my eight-track home studio, and I was especially gratified to see that the only two keyboards I have ever purchased, the Ensoniq Mirage and the Yamaha DX7, were both featured in your article. They've served my purposes well and allowed me the versatility of utilizing analog and digital (albeit only 8-bit) sounds.

Dale E. Creech, Jr.
Dayton, OH

"20 Instruments" was a keeper. I love the old machines because they offer much of the joy that the best synths can provide: the possibility of *play*, of fun, and sound hacking. Still, I must protest against the oft-repeated criticisms of the Radio Shack Moog. I have an MG-1 and I think it's neat. It gives good noise and costs zip. How about a retraction?

Donald Hargrove
Memphis, TN

One critical synth was omitted from your Top 20, even though you actually mentioned it in your write-up on the Minimoog: "Wendy Carlos's landmark *Switched-On Bach*, recorded on a modular Moog, had just introduced synthesizers to the world." Quite an endorsement for the modular Moog, one of the biggest (figuratively and literally) "shakers" of them all. I admit some bias, as a proud owner of one of these rare creatures, but the modular Moog did more than just open the door: It blew it off the hinges! Want more shake? Try the low end. Nothin' comes close, then or now.

Jerry Gaskins
Richmond, VA

One synth you didn't mention was the Ensoniq ESQ-1. This, not the Korg M1, was actually the first instrument with an on-board sequencer. The ESQ-1 also had dynamic voice allocation and sample waveforms, although, unlike the M1, it didn't have any effects processors.

Mark Furst
Internet

[*The Synergy had an on-board sequencer well before the ESQ-1. Four tracks, no editing, but it was a sequencer.*]

How can Jim Aikin overlook the ESQ-1's role in the development of modern synths? Does he

really believe the Wavestation was more important? The ESQ-1, not the M1, was only the first workstation for non-zillionaires. It had wavetable ROM, it was eight-way multitimbral (dynamically allocated), it had a quite capable eight-track sequencer. Short of modern technological sophistication, it had everything you'd find in a modern workstation except effects (which was the D-50's real contribution). Aikin also credits the D-50 with being the first synth to contain sampled waveforms stored in ROM. Totally wrong: Again, the ESQ-1 was there first. (Well, maybe not first. RMI and Korg products also featured sampled waveforms prior to the D-50.)

As a long-time Ensoniq user, I'm particularly sensitive to Aikin's obvious condescension toward that company. He has repeatedly beaten up on Ensoniq unfairly and credited other manufacturers for "innovations" long available to Ensoniq owners. I'm concerned that young students who read this most recent article may mistake Aikin's myopic history for the truth.

Robby Berman
Saugerties, NY

[Several instruments, including the ESQ-1, had single-cycle waves extracted from samples. The D-50 was, to the best of our knowledge, the first synth that had longer non-looped samples in ROM.]

After glancing through "20 Instruments," I couldn't help but chuckle over how people went on about the "soul" of these old machines. If you look in almost any issue of *Keyboard* c. 1980-'84, particularly in articles about bands like Kraftwerk, Ultravox, and Gary Numan, the authors could not get over how cold and soulless these artists were with their ARP 2600s and various Moogs. Nostalgia? Hypocrisy? Selective memory?

Bradley E. Beving
Minneapolis, MN

Yamaha ProMix 01

We believe that numerous factual errors and several reckless conclusions were included in your review of the Yamaha ProMix 01 digital mixer [Jan. '95]. The central issues we are disputing are perceived noise levels of the ProMix and that the unit is only usable "if your mixing is limited to balls-to-the-walls heavy metal speed rock or live performance in noisy venues."

As with *any* mixing system, proper gain structure is the key to achieving optimal sound quality. This is a *fundamental* recording principle, and with proper gain structure you will hear the stunning audio quality of which the ProMix is capable. Is it possible, then, to gain-stage a system with a ProMix in such a way as to produce "unacceptable" noise? Absolutely. And your reviewer certainly accomplished this.

As to your suggested use of the ProMix for speed rock applications, we would like to add several more. Among the real-world applications in which ProMix 01 is excelling and winning converts: gentle orchestral soundtracks for two major motion pictures, reference mixes on a major national concert tour, and as an integral part of live sound systems for network telecasts. On the recording side, ProMix 01 is quickly earning its reputation on a wide range of sonically demanding sessions, from quiet jazz performances to the New York State Opera in the New York State Theatre.

Sonic quality and powerful mixing features are just two of the reasons why ProMix 01 has already earned considerable respect from Grammy-winning engineers and top-charting recording artists, all of whom can afford to buy practically any mixer in the world and yet choose to use the ProMix 01.

We respect that *Keyboard* prides itself on taking a hard stand when it comes to reviews. There are many other professional audio trade publications that hold the same position. Fortunately, the overwhelming majority of them are singing the praises of the ProMix 01. But your readers shouldn't take their word — or yours — for it. How about listening to the crystal-clear

Continued on page 126 ►

WHY MACKIE IS YOUR BEST 8-BUS

Lately, several big pro audio companies have gone out of their way to "mention" us in their own 8-bus console ads. Many satisfied Mackie owners have urged us to shoot back with hardball comparisons of our own. But that's not our style.

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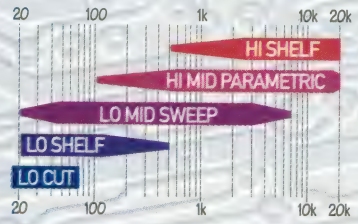
To quote Electronic Musician[1], *"It's no secret that the versatility and pristine sonics of the 8•Bus EQ have astonished jaded pros and home hobbyists alike. The 4-band EQ section includes two shelving controls fixed at 12kHz and 80Hz; parametric high-midrange EQ with a 500Hz to 18kHz sweep and a bandwidth that can be adjusted between three octaves and one semitone; and low midrange EQ with a 45Hz to 3kHz sweep. A full 15 dB of boost or cut is provided for each band. In addition, an 18 db/octave low-cut filter is set at 75 Hz. That's a heck of a lot of firepower!"*



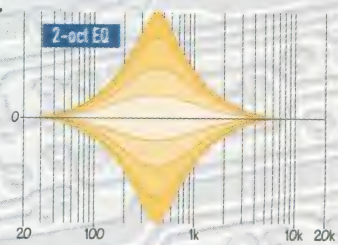
No kidding. But we also like that part about pristine sonics. One of the reasons that the 8•Bus Series took so long to ship was that Greg was determined not to compromise EQ sound quality. Cheap circuitry can create all sorts of sonic grunge that may add distinctive "character" to a console's EQ... but Greg's goal was clarity, not eccentricity.

To further quote Electronic Musician, *"In all applications, the 8•Bus EQ was extremely musical and transparent... One of the engineers summed it up best by saying, 'The 32•8 is so clean that you don't really hear the EQ; everything sounds deceptively natural, which is really great.'"*

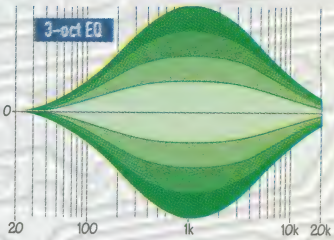
We wouldn't have it any other way.

What parametric EQ means to you.

The biggest gun in the 8•Bus' EQ arsenal is its true parametric high midrange EQ. Conventional sweepable midrange (like our 8•Bus' *low* mid), has a fixed bandwidth of about 2 octaves. No matter how high or low in frequency you sweep it (or how much you boost or cut it), 2-octave EQ's *contour* stays the same. While extremely useful, it's just one tonal "color." Having to rely on swept, 2-octave midrange alone is like being asked to paint a picture with only a bucket of bright yellow paint.

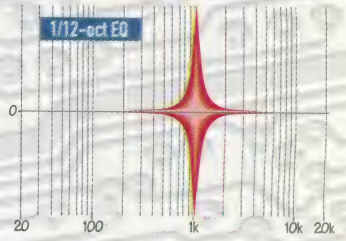


By letting you vary the bandwidth, parametric EQ gives you the equivalent of a full rainbow of tonal "colors" in your artistic pallet. Spreading high midrange EQ over three full octaves transforms it into an extremely subtle — yet extremely dramatic — effect[2]. Sweet and natural-sounding, it can unobtrusively change the character of a track without noticeable tonal intrusion. If you're used to conventional 2-octave swept midrange, you'll be surprised at how much 3-octave EQ you can add without things starting to sound obnoxious.



On the other hand, there are times when you want what can only be called surgical EQ. At its narrowest, our parametric Hi Mid is four times as precise as a 1/3rd-octave graphic equalizer. It's like having a delicate artist's brush and a magnifying glass for erasing or enhancing tiny details.

Between three octaves and 1/12-octave is a vast range of tonal colorations, nearly all possible only with parametric equalization. And, since our "HI" mid's sweep range extends from 18kHz all the way down to 500Hz, your creative palate extends over six octaves — to our knowledge the widest midrange sweep currently available[3].



Above Left to right: 32•8 console with MB•32 meter bridge, 24•E Expander with MB•E meter bridge, and The Sidecar.

Apparently we're not alone in our belief. In competition with many of the very consoles that keep "mentioning" us in their ads, we recently won the coveted *MIX* Magazine TEC Award for Small-Format Consoles. As well as *LIVE! Sound* magazine's Best Front of House Mixer Award.

To learn why, call us toll-free for our detailed, 24-page 8•Bus brochure.

[1] September 1994 issue, page 64, in a sidebar to an article on The British Invasion (of consoles). We urge you to read the whole thing so that we don't get in trouble for quoting stuff out of context.

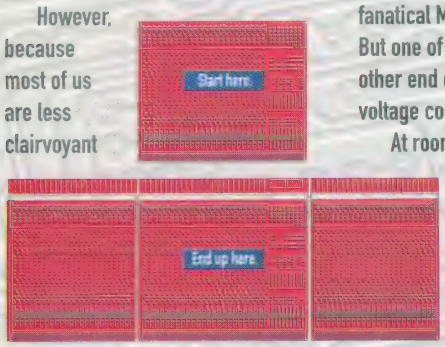
[2] This is what we meant when we used the phrase *"Expensive British Console Sound"* in our first 8•Bus ads: Classic English desks were the first to offer extremely wideband (i.e. greater than 2 octaves wide) equalization. Obviously we didn't make ourselves clear on this point, because everyone from our competitors to at least one reviewer has taken us to task over this phrase. Okay, we apologize to all of you Anglophiles. We were merely trying to explain why we consider wide bandwidth EQ such a powerful tool and where we got our inspiration for including it... not attempting to rekindle the Revolutionary War.

CONSOLE CHOICE

An expandable console system.

If you can successfully foretell the future, you might as well play the commodity futures market, make a zillion bucks and buy a 128-channel SSL console.

However, because most of us are less clairvoyant and a lot poorer, we've designed a system that can grow with your needs and budget. Start with our 24•8 or 32•8 console[4]. Then, when your tax refund comes back, add an optional meter bridge[5]. When you land that Really Big Project That Pays Actual Money, add more input channels (and tape returns) in groups of twenty-four with our 24•E Expander console[6].



You can keep right on growing your Mackie 8•Bus console system up to 128 channels or more.

And, beginning this spring, you can automate the whole shebang with our extremely affordable Universal MIDI Automation system. It consists of the OTTO-34 VCA gain cell unit, wicked-fast Ultramix™ Pro software and the innovative OTTOpilot™ control interface. Both the hardware and the software were debuted in final form at last Fall's AES Convention. They received rave reviews from seasoned pros who are used to working with "mega-console" automation systems.

3 . . .on a comparably-priced 8-bus console. Oops! We're starting to sound competitive.

4 $3,995 (24•8) and $4,995 (32•8) suggested retail. Slightly higher in Canada.

5 $795 (MB•24) and $895 (MB•32) suggested retail. Slightly higher in Canada.

6 $2,995 suggested retail; MB•E meter bridge $695. . . Yadda yadda, Canada, etc. etc.

Very Low impedance Circuitry (VLZ) for very low noise.

We like to say that the 8•Bus console's monster 220-Watt Power Supply was a product of typical, fanatical Mackie over-engineering. But one of our real motives lies at the other end of the power supply's multi-voltage connecting cable.

At room temperature, all electronic components create thermal noise. Cumulatively, this can become audible and objectionable. We design around thermal noise by making internal circuit impedances as low as possible in as many places as possible. For example, resistor values in our mix bus are 1/4 the value of those typically used — hence thermal noise is proportionally lower. Another advantage of VLZ is that low-impedance circuitry is far more immune to crosstalk problems.

VLZ

VLZ isn't easy to achieve. All circuitry must be thoroughly buffered. Plus, console current consumption goes way up, requiring a beefy power supply. Such as the massive, 31-pound, power supply we ship with each 8•Bus console.

Powersupplyus Humungoidus

+4dBu operation throughout.

This is a biggie in terms of overall noise and headroom. There are two current standards for console operating levels: –10dBV and +4dBu. Without knocking our competition, let's just say that +4dBu is the professional standard, used with all serious recording, sound reinforcement and video production components. This higher operating level effectively lowers the noise floor and increases dynamic range. Our 8•Bus consoles operate exclusively at +4dBu (although their tape outputs and returns can be switched to –10dBV to match other semi-pro/hobbyist gear you may still own).

Built like tanks.

Our 8•Bus Series consoles have been in the field long enough to gain an almost legendary reputation for durability. For example, a lot of them absorbed the impact of toppling monitor speakers during last year's Los Angeles earthquake with little more than a few broken knobs. Others have survived drops off loading docks, power surges that wiped out whole racks of outboard gear and beer baths, not to mention hundreds of thousands of air and semi trailer miles with major tours[7]. Read our 8•Bus tabloid/brochure to learn about the impact-absorbing knob/stand-off design, fiberglass circuit boards and steel monocoque chassis that make our consoles so rugged.

Bottom line: You simply can't buy a more dependable console. Maybe that's why *LIVE! Sound* magazine readers voted us their 1994 "Best Front of House Console."

7 Including the latest Rolling Stones, ZZ Top and Moody Blues tours. (Footnote to the footnote: Mention in this ad denotes usage only, not official endorsement).

We could go on this way for pages.

If we got into the details of 8•Bus features like special RFI protection, triple tape bussing, in-place stereo solo, constant power pan pots, or the extra 15dB of gain available at the 8•Bus's aux sends and returns, this ad would have even teenier type than it already has.

For these and other facts, call us toll-free (8:30AM-5PM PT) and ask a real live person for our obsessively-detailed, 24-page 8•Bus brochure.

OUR 8•BUS CONSOLES REALLY WORK. THE UPDATE:

Ricky Peterson mixed ☥'s recent hit single, *"The Most Beautiful Girl in the World"* on his Paisley Park Studio 32•8 console.

Queensryche's new platinum album, *Promised Land*, was totally tracked on Mackie 8•Bus consoles (with help from OTTO-automated CR-1604s). A sonic (and musical) masterpiece, it has the tight bass, crisp highs and ear-boxing dynamic range that's becoming an 8•Bus console signature. Need more proof as to why pros prefer Mackie? Buy this superb CD.

MACKIE.

16620 Wood-Red Road • Woodinville • WA • 98072 800/898-3211 206/487-4337
mackie.com • Outside the US 206/487-4333• Represented in Canada by S.F. Mktg. 800/363-8855

world view

ASSEMBLED BY ROBERT L. DOERSCHUK

Mix Master Morris

CHILLING THE GLOBAL TECHNO REVOLUTION

Mixmaster Morris wants everybody to "stop dancing and lie down and be counted." As ambient techno's most visible catalyst, he plays an average of 100 gigs a year of live improvised electronic music at the world's top ambient clubs. From Frankfurt to Tokyo to San Francisco and back, he zigzags across the globe in a silver suit, proselytizing for a new consciousness with beautiful music and a philosophy based on smart drugs, zippy Internet communication, and a belief that electronic music is the music of the future.

"Conny Plank, who produced almost every German electronic group of note, said, 'Great music is made when artists, engineers, and producers play together like children.' I've always tried to uphold this philosophy," Morris points out. "If music is not fun to make, then it won't be fun to listen to either."

On Morris's first Irresistible Force album, *Flying High*, he explored texture and restrained beats simultaneously, pulling into his flux the sounds of Kraftwerk, Spacemen 3, the Prague Symphony Orchestra, and Joyce Grenfell, along with the soothing monolog of psychotropic guru Terence McKenna. It's an ambient masterpiece, no less essential than the Orb's *Adventures Beyond the Ultraworld*.

"I made that on an E-mu Emax, a Cheetah MS6, and an Octave Cat," Morris recalls, "in a very primitive studio that Rising High had in London, with rain coming through the roof and plastic cups on the mixing desk to catch the drips. You couldn't move certain faders, because there were cups in the way. Terence McKenna is on there because I accompanied him at his London lectures. He's written many books, including *The Food of the Gods*, and he's very important to the engendering of hippie ideals in the techno culture. Frazer Clarke [publisher of the new psychedelic magazine *Evolution*] was the one who presented such people as McKenna, Robert Anton Wilson, and Alexander Shulgin to a techno audience in Britain. This has helped shape youth culture for the next decade."

Morris began his live improvisations in 1980. A child of the punk scene, he believed in the ethic of propagating one's own music through small labels and fanzines. Influenced by the likes of Can, Suicide, and Cabaret Voltaire, he concentrated on extracting sounds from primitive drum machines and Wasp and Copycat synths in his early gigs. He went through a Commodore-64 and a Sinclair Spectrum before getting his hands on his first proper sampler, an Akai S612, in the mid-'80s, when he began creating Mongolian hip-hop tracks. By 1988, house was in full swing. "But," he remembers, "it was almost impossible to find clubs that would let you do live techno with a sequencer, a sampler, and a drum machine. All the music they played was on records."

During the late '80s, Morris sat at the feet of the Orb and KLF as they invented ambient house. Then he was off, DJing for the Shamen on a 100-city tour and becoming tight with everybody from the original Detroit techno innovators to Aphex Twin. "I've always been interested in intelligent techno," he explains. "Taking the power away from the DJs and showing that techno could be creative has affected a great change. It's now much wider than just dance music. Ambient techno has gone way beyond the Orb. Once it got to CD, it really proved itself."

Morris's new album, *Global Chillage* (Astralwerks) uses texture modulation and time delay to warp the listener's sense of space and duration. It's an hallucinogenic sound experience, designed to stimulate those areas of the brain that respond to E, DMT, and LSD. Yet it's a natural, drug-free experience, available to all to download from his Internet site (http://www.mit.edu:8001/people/trellos/homepage html).

"I take things, loop them, and listen to them for long periods of time. I then modulate them with the mixing desk faders, mute buttons, and drop-in and drop-out buttons. I'm into having everything change throughout the music. The great thing about house was that it established [timbral] modulation on its own as interesting. Changing just the Q parameter of a bass line is, to me, as radical as anything by John Cage. To accept timbral change as enough to constitute viable music was a revolution.

"My next album will be done entirely inside the Mac, using no sources outside the computer. I've been designing virtual synths and downloading them onto the [Digidesign] Audiomedia card. I like the idea of downloading your own synth package, then having to write your own plug-ins for synths. More programmability will be the next innovation in techno." —*Mark Prendergast*

World View News

CAREER UPDATE

ONSTAGE. Lalo Schifrin continues his quest to bring jazz and classical music into happy harmony throughout '95. On Feb. 23 he supervises a performance of *Gillespiana*, his orchestral tribute to **Dizzy Gillespie**, at Carnegie Hall. Schifrin will repeat the program on Apr. 22 and 23 in Glendale and Los Angeles; both concerts feature the Glendale Symphony Orchestra, which Schifrin serves as musical director, with **Ray Brown**, **Jon Faddis**, and **Grady Tate** among the guest soloists. . . . Mega-charting R&B producer/performer **Kenny "Babyface" Edmonds** has completed his first solo tour as co-headlining act with **Boyz II Men**. Edmonds restricted his keyboard activities onstage to the piano, with **Randy Walker**, **Alex Alessondroni**, bassist **Reggie Hamilton**, and guitarist/saxophonist **Reggie Griffin** sharing multi-synth parts in his band. . . . Only the strong survived the New Year's Eve bash at New York's Limelight, where **Lords of Acid** welcomed '95 with a typically incendiary set. . . . **Jeff Jacobs** plays keys on the comeback trail with **Foreigner**. The definitive arena rock band has wrapped up the international leg of its world tour to support their new album, *Mister Moonlight*, and is now shaking rafters throughout the U.S. . . . It seems somehow appropriate that the **Residents** scored *Hunters*, the 13-part celebration of nature's predators, shown on the Discovery Channel last December and January. If you missed it, you can still ponder the recent work of this paradoxically famous and mysterious avant-garde outfit on their *Freak Show* CD-ROM and at the New York Museum of Modern Art, whose permanent collection now includes two Residents *objets*.

ON DISC. Electronic instrumentalist **Patrick O'Hearn** has launched his own record company. O'Hearn collaborations with **Mark Isham** and **Peter Manu** are among the first releases scheduled by his Deep Cave label. . . . Will **Sparks** catch fire? *Gratuitous Sax & Senseless Violins*, featuring synth and sequence demon **Ron Mael**, marks the disco/new wave act's return to recording after a six-year hiatus. Look for it in mid-March on ►

Internet Surfer

NEWS TO THE WISE

Tired of those soggy newspapers on your doorstep? Stop calling the complaint line and dial up the network news. The network news is a massive collection of email discussion groups on any subject under the sun. The groups range from hobbyist to professional subjects and contain user-posted email messages. Many of these groups come and go like the seasons, so information on how to access them goes *out of date quickly.*

The most common network news maintenance organization is USENET. USENET newsgroups are organized by group parents (comp, news, rec, sci, soc, talk, misc) and subgroups (music, software, games, animals, culture, etc.) with names separated by periods. Other group parents include alt, biz, k12, and gnu.

A newsreader is necessary for accessing the network news. The four standard UNIX newsreaders are rn, trn, nn, and tin. Of the four, nn and tin are the most robust and widely used. You can also access newsgroups through SLIP/PPP programs like Netscape. You can find Netscape by anonymously FTPin' ftp.mcom.com in the path /netscape.

The comp newsgroups contains computer-related topics. The comp.music newsgroup is great for information on MIDI file and software archives, soundcards, synthesizers, MIDI troubleshooting, hardware and software sales, and audio compression. The comp.multimedia group has discussions on multimedia authoring tools, compression issues, audio and MIDI soundcards, FTP sites, and file formats with respective file-type encoders and decoders. Some other music and multimedia related newsgroups are comp.sys.ibm.pc.soundcard.music, comp.os.os2.multimedia, comp.publish.cdrom.multimedia, comp.mail.multi-media, comp.sys.sgi.audio, and comp.sys.amiga.audio.

In the rec newsgroups you'll find hobbyist and recreational discussion groups. The rec.audio.pro newsgroup houses discussions on audio hardware and software, speakers, mixers, recording techniques, analog and digital recording, and audio cables. In rec.music.makers.synth you'll find information on software compatibility, new and vintage synthesizer sales and requests, operating system questions and responses, some specifications, and FTP archives. The rec.music.classical contains everything from CD reviews, librettos, and stories about composers to a lecture on clapping etiquette between symphonic movements. If you're looking for Iron Maiden and Amy Grant FAQs (frequently asked questions), discographies of various artists, or just general music information, try rec.music.info. Other rec newsgroups include rec.audio.high-end, rec.audio.tech, and rec.music.synth.

The alt newsgroups have discussions on alternative topics. The alt.binaries.sounds.midi newsgroup contains uu-encoded MIDI files and materials for sequencer and notation programs. In the alt.music.midi group keep your eyes open for FTP sites, hardware and software information, soundcards, MIDI cable information, and subjects like PowerBook/MIDI problems and solutions. The alt.binaries.sounds.misc newsgroup is filled with uu-encoded .zip .wav soundfiles of everything from Monty Python snips to radio transmissions from Armstrong's first moonwalk. Some other alternative newsgroups include alt.music.* groups, alt.binaries.sounds.cartoons, and alt.binaries.multimedia. If you need a uu-encoder/decoder, anonymously FTP gopher.eunet.es: Mac users look in the path /pub/mac/mail; DOS users look in the path /pub/msdos/encoder/uuencode.

Newsgroups are great for gathering research information or just viewing flames (scathing discussions). The degree of discussion is wide enough that most people will find something of interest. Use caution when posting mail messages, because people love to flame and you could become the next news-item victim. —*Mark Grey*

What do members of the Cirque du Soleil band do between performances of the company's stunning surreal show, *Alegria*? Luckily for local musicians, they host clinics in which they share their approach to using Roland gear under the big top. Here, drummer Joe Bertrand, singer Isabelle Corradi, and music director/keyboardist Claude Chaput hold court during the Cirque's stay in Los Angeles last November. Upcoming clinics will take place as *Alegria* moves on to New York, Toronto, Chicago, Boston, Washington, and Atlanta.

PHOTOGRAPHY: **WEBB CHAPPELL**

NEIL GERSHENFELD'S FINGER BATTLES FUTURE TECHNOLOGY AT MIT'S DIGITAL EXPRESSION CONFERENCE

The Media Lab at the Massachusetts Institute of Technology is one of the truly great gigs, a place where artists with a technical bent and technologists with an artistic vision could play at reinventing the world. Within its walls there is no secrecy: Communication across disciplines and projects is encouraged, with all sponsors having equal access to the results of all research.

In keeping with that open spirit, the Media Lab hosted its first Digital Expression conference on Oct. 20, 1994. The brainchild of Media Lab mainstays **Michael Hawley**, **Neil Gershenfeld**, and keyboardist/composer **Tod Machover**, the conference attracted more than 2,000 representatives of the arts, science, and business to explore the future of creativity in the face of new technology.

The day began at MIT's Kresge Auditorium, just enough behind schedule to let the audience learn to cope with the audio chips in their daily programs. (These would applaud and whistle unless opened in a specific way, a source of much inadvertent amusement throughout the day.) Opening remarks were provided by MIT President **Charles M. Vest** and radio/TV reporter **John Hockenberry**, the conference's emcee.

The first seminar, "Active Meaning," was the artists' panel. It featured Machover, rock star **Peter Gabriel**, conceptual artist **Laurie Anderson**, and theater director **Peter Sellars**. The tone started out low-key and informational, with audience questions typically focusing more on process than purpose. This changed when Sellars took the floor. Prodded by his funny, firebrand style, the panel ended up examining a wide and inspiring range of creative possibilities.

Next came "Artistic Appliances," the technologists' turn. This time there was no interaction, just a series of four mini-lectures with accompanying slides. Neil Gershenfeld began with a talk about a new Media Lab motion-sensing technology which grew, by accident, from an attempt to capture the bowing of a cello. As Gershenfeld talked, he would sweep his arm gently toward the Apple PowerBook on the table next to him, and his slide show would advance. The trick? Sensors in the table detected infinitesimal changes in the electric ►

You Know This Guy!

You've probably never seen him or heard his name. But you've almost certainly heard his music. If you've got a son somewhere between the ages of five and maybe 13 years old, you've *definitely* heard it. In fact, you're probably sick of it.

Hint: Thrashing drums. Fuzzy power chords. An inhumanly fast and inane guitar solo: "*diddle-iddle-iddle-iddle, diddle-iddle-iddle-iddle.*" That six-note motif, chanted on playgrounds and in living rooms by ferocious little boys transplanted from *Lord of the Flies*. Finally, the lyric hook, the one that's driving teachers and parents crazy five days a week on Fox. You know it, don't you? Come on, sing along, just this once. One, two, three:

"*Go, go, Power Rangers!*"

That's right. This is the guy whose music has captured your once innocent child. His name is Ron Wasserman. He wrote the theme to the phenomenally popular *Power Rangers* show, as well as all the underscore for each episode. That's not all: He also does all the music for *VR Troopers* and *Sweet Valley High*, two other smash kid-vid series. As you read this, he's deep into his first film soundtrack, for the inevitable Power Rangers movie, which will demolish box office records this summer.

Not bad for a self-described failed student who "flunked every music class I ever took," who once bluffed his way into a staff position at Marantz by letting the brass think he had a music degree, and who rocked the prepubes with a bonehead guitar sound and slightly off-key vocals.

"I've been working for [*Power Rangers* production house] Saban for about five years," Wasserman explains. "I got called in, and they said, 'We have this *Power Rangers* thing. It's live action, like *Godzilla*. Can you whip something up for it?' The only thing [CEO] Haim Saban specifically asked me for was to use the words 'go, go,' because that's his lucky phrase; he used it in 'go, go, Gadget,' from *Inspector Gadget*. The VP of music suggested I edit down this song I was writing for *X-Men*. So that night, I cut it to about a minute, came up with the 'go, go, Power Rangers' thing, and flew that on myself as a guide vocal.

"The next morning, Haim had a meeting with Fox, and there he played the theme. It was a rough mix. I did it in two and a half hours. But they bought it. That turned into, 'You're on the theme, so now you have to be on the songs.' Since then, it's been nuts."

The demo that shook the world replicates a power trio, with drum samples grabbed from a variety of libraries and a dental-drill guitar built entirely by sending the Rock Gitaro patch in an E-mu Proteus/1 through a tweaked guitar effect in a Korg A3 signal processor, with a bit of chug added from East-West's Steve Stevens Collection. "I went through a lot of Kurzweil guitar samples, and they sucked," Wasserman says. "The Proteus with the A3 gave me a unique, weird, thin, perfect-for-TV, midrangey quality. It cuts through in mono."

Despite, or maybe because of, the fact that the job was so rushed, the theme suits the show's manic energy. "Had they redone it with another singer the next day and spent a lot more time on the track, it would have turned into that nice sterile thing that I hate," Wasserman says, "which is what happened with pretty much every theme I'd worked on for Saban up to that point. We must have put 300 hours into the *X-Men* theme. It turned into, like, 70 tracks. I mean, this was for *television*! It's ridiculous."

His music for the Power Rangers stage extravaganza was thrown together in something of a frenzy too. "It was such a last-minute thing. I did all my rough mixes through this little Samson MPL-2242 board at home, and it got too late to remix because they needed to start editing and moving the music to dialog. Two touring companies, nine months on the road sold out, one of the ten top grossing tours of '95 — all to a rough mix. The story of my life."

Life is getting busier still, with the movie to score, more TV shows, and several recording and concert projects with Jon Anderson. "And BMG handed me this yesterday," Wasserman adds, shoving a CD our way. "This is the European Power Rangers single, and it's sold 220,000 copies in five days. I'm supposed to start writing the second single now. Here in the States, the *Power Rangers* theme is on extreme heavy rotation in, like, Florida, Seattle, Houston. They're putting it up against bands like Soundgarden on adult CHR stations — *and I'm beating them*! I'm not buying a beach house in Maui yet, but this is fun."

—Robert L. Doerschuk

World View News

the Logic label. . . . Speaking of dance floor flashbacks, **Duran Duran**'s long overdue collection of covers, *Thank You*, should be out in March as well, with **Nick Rhodes** and his fellow fashion casualties dishing up their arrangements of "Crystal Ship," "Ball of Confusion," "911 Is a Joke," and other eclectic fare. . . . Industrial rockers **KMFDM** unleash their next release, *Nihil*, on Wax Trax!/TVT in March. . . . **Billy Taylor** and **Ramsey Lewis** release their next GRP albums on Feb. 28. . . . **Wayne Horvitz** was the perfect choice to play keys on the latest **Gary Larson** televid special, *Tales from the Far Side*. **Bill Frisell** handled the guitar parts.

ROUND & ABOUT. Even the greats slip up now and then. **Klaus Schulze** was introduced to members of **Pink Floyd** during their German tour last August. According to our spies, Schulze reportedly addressed Floyd synthesist **Rick Wright** as **Tony Banks**. "Most funny for everybody," wrote the *Keyboard* contact. "What laughter!"

BULLETIN BOARD

TECHNO INNOVATOR SHOT. Wax Trax!/TVT artist **Kenny Larkin** was shot in the stomach and severely wounded last Nov. 18. After surgery and a week in the hospital, Larkin was released on Thanksgiving to begin recuperating at home. Reasons for the assault remained unclear as we went to press. Messages may be sent to Larkin c/o Art of Dance, Box 201, Royal Oak, MI 48068.

PC MUSIC CLUB. January '95 marked the birth of the PC Music Club, a British user group dedicated to helping musicians stay on top of developments in hardware and software. Members will receive an information package designed to cover their specific needs, based on the gear they own and/or plan to purchase, with updates sent along every two months. A newsletter will provide a forum for readers to trade ideas, opinions, and patches. In addition, the PC Music Club plans to sponsor special events in which software and soundcard manufacturers will give demonstrations and sell selected products at discount. For more information, call (011-44-81) 933-2046, fax (011-44-895) 850-128, email matt@states.demon.co.uk, or write PC Music Club, Box 587, Harrow, Middlesex, HA2 9EW England.

Road Report

DEREK SHERINIAN WITH DREAM THEATER

When last we spoke to keyboardist Derek Sherinian, he was circling the globe with Alice Cooper (see April 1990 issue). Since that report, he's guested on Cooper's latest, *The Last Temptation*, he's toured and recorded with Kiss, and now he's landed one of rock's hottest synth seats: Dream Theater.

To bring you up to date, longtime Dream Theater keyboardist Kevin Moore parted amicably with the band in early '94 to pursue solo endeavors. Jordan Rudess sat in temporarily, but it was Sherinian who filled the bill for the band's 1994/95 *Awake* world tour. Although he's a hired gun for the time being, Sherinian hopes it will evolve into a permanent position.

The Audition. "I had one week to learn four songs: 'Pull Me Under,' 'Take the Time,' 'Caught in a Web,' and I forget the other one. I wasn't very familiar with the band before the audition, but once I heard their music, I knew I had to have this gig." Sherinian flew to New York and nailed the audition on rented gear. "The best advice I can give to anyone going through this is to go in, put out a friendly vibe, and keep your mouth shut. Let the playing do the talking." Apparently the keyboardist's personality and chops clicked with the band's. "We all went to Berklee," he says, "and we have some mutual friends, so it was a really good vibe." Incredibly, the tour started just two weeks later. "I had to learn two hours' worth of material in two weeks — and this is intense shit! Every minute I was awake I was shedding these tunes, and I played the set tape as I was falling asleep so I would get the stuff subliminally." To make matters even more stressful, drummer Mike Portnoy caught pneumonia, leaving the band only three full rehearsals before going out.

Gear. Compared to the monster rigs of yesterday's prog rock champions, Sherinian's setup is a piece of streamlined beauty. Onstage he uses an Oberheim Eclipse, a Korg 01/W, and a Roland JD-800. The rest is neatly tucked into a rack behind him (see photo). "I use the Eclipse exclusively for my piano, and a MIDI-fied Korg CX3 layered with an Oberheim OB-3 for my organ sound." Both are routed through a Dynacord DLS223 Leslie simulator.

Patchwork. "Kevin Moore was very helpful. He sent over a JD-800 RAM card that he used on a lot of the stuff, which was very cool of him. For the rest, I just tried to match the sounds as closely as possible." Onstage, Sherinian uses one JD-800 bank per song. "I do all of the patch changes by hand. Each time I go up and play the set, it's a routine. You know, it's the same thing as an ice skater who works out a routine, except mine consists of playing passages, patch changes, and whatever else I need to do. After you do it for a few shows, you lock into a groove."

Sherinian at soundcheck. The Oberheim Eclipse, one of his three onstage controllers, eclipses a Roland JD-800 and a Korg 01/W. Not pictured is a Fisher Price one-octave keyboard Velcroed to the top of his Apex stand. "It's the centerpiece of my rig," he chuckles. His rack, from top to bottom: Oberheim OB-3 Drawbar Expander, OB-Mx, pair of Matrix-1000s, and Echoplex Digital Pro, Furman PL8 power module, Kurzweil K2000R, Digital Music MX-8, Mackie CR-1604, Alesis Quadraverb, and Dynacord DLS223. Peeking out from the left is a Korg CX3.

Reflections. "One of the things that's really great about this gig is that the guys are giving me a lot of room to cut. I get a two-minute solo spot, there's a section in 'Take the Time' where I do a jazz piano thing, and there are solos left and right. There's a lot of stuff where the keyboard is doubling the guitar in unison — sixteenth-notes at 220 on the metronome. It's pretty sick. There are a lot of complex melodies and harmonies going on, but it's still very, very heavy. If you look out in the crowd, you'll see the kids moshing and headbanging like they would at a Metallica show. There's something for almost everyone. This is probably the coolest rock keyboard gig in the world right now." *—Greg Rule*

PHOTOGRAPHY: **MARCUS HANSCHEN**

field through which his arm swept. Unfortunately, a software glitch shut the sensors down exactly as he revealed how the trick was being done, and he had to control the rest of his presentation using a more primitive digital system: his finger.

Atari founder **Nolan Bushnell** followed with a very funny talk on the history and potential pitfalls of the video game industry. Then computer music pioneer **Max Matthews** recapped the history of digital synthesis, somehow leaving out everything between 1965 and the DX7. Finally, filmmaker/special effects artist **Douglas Trumbull**, now vice-chairman of Imax, spoke about current and upcoming technologies in ride films and virtual realities.

Lunch speaker was **Quincy Jones**. Along with an overview of his own lengthy production experience, he offered a heartfelt plea that underprivileged children not be left behind as the digital revolution zooms ahead.

The day's third seminar, introduced by Media Lab founder **Nicholas Negroponte**, was an odd duck combination of business and government called "Infrastructure For Creativity." **Jane Alexander**, head of the National Endowment for the Arts, strongly argued that art and technology should improve the quality and character of people's lives, not merely expand the status quo. **Michael Schulhof**, president and CEO of Sony Corporation of America, left everyone blinking as he gave a content-poor PR pitch for Sony that would have been more appropriate at a stockholder's meeting. Last up was **Raymond Smith**, chairman and CEO of Bell Atlantic. He lit up everyone's eyes by detailing the upcoming development of billions of dollars' worth of interactive fiber-optic networks, which by federal law will have to be at least 50 percent public access in terms of content providers.

The conference closed with **Penn & Teller**, assisted by a road crew of MIT techies. Using Gershenfeld's sensor technology (which worked flawlessly this time) and computer music systems designed by Machover, the two comedian/magicians set out to raise the spirit of Houdini. They didn't, of course, but they did conjure lots of laughs and a shining example of the art/technology merger that the conference was all about.

After that, it was off to the Media Lab itself, for drinks, food, conversation, and hours of wandering the halls and looking at the latest research demos. In a way, this unstructured sharing was the *real* point of the conference, and all the rest preamble. What wild schemes and visions may have been hatched among these corridors and computers? For at least some of the answers, we'll have to wait until next time.

—Connor Freff Cochran

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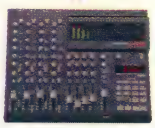
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interFACE

BY MICHAEL MARANS

In the Stores

Music Industries is offering two 88-note weighted-action MIDI master controller keyboards, the **Studio-900** and the **Studio-1100**. The 900 ($1,295 for the cabinet version, $1,395 in a road case) features a mod wheel that can be programmed to generate any MIDI controller message, including continuous controllers, aftertouch, and program change and bank select commands. The 1100 ($1,695 for the cabinet version, $1,895 in a road case) features the same programmable wheel as the 900, plus aftertouch, four zones, a master volume control slider, a programmable slider, a programmable CV pedal input, and MIDI merging.

Hammond/Suzuki jumps on the General MIDI bandwagon with the introduction of the **GM-1000 sound module** ($795). The half-rack-size module features 368 patches (128 GM, 138 variations, including a variety of Hammond organ sounds, and 102 drum voices arranged in nine kits), 32-note polyphony, 16-way multitimbral operation, and built-in effects, including reverb, chorus, Leslie speaker simulation, echo, flange, and delay. Also included is a serial connector for interfacing the unit directly with Macs and PCs. A bonus for XB-3 owners: The GM-1000 can slide in behind the removable panel at the XB-3's left side; its MIDI cables are then connected to the XB's accessory panel. This setup eliminates the nasty mess of stacked instruments and tangled cables normally associated with today's music-making. (We shudder just thinking about it.)

After what a company spokesperson termed "a constipated development cycle," Mackie has finally released the **LM-3204 rack-mount line mixer** ($995). The unit features 16 stereo input channels, each of which has electronically balanced inputs (capable of accepting –10dB or +4dB signal levels), two stereo and two mono aux sends, a mute/alt output switch, three-band EQ, a solo switch, and a signal presence/overload LED. Two mic preamps (with phantom power) can be patched into any input channel. The master section offers four stereo aux returns and a separate control room monitor level control. Plans are in the works for an expander module; up to four expanders can be daisy-chained, for a total of 80 inputs.

LightSpeed is now shipping their **4000DX**, **2000DX**, and **900DX wireless microphone systems**. The units feature proprietary tone-encoding (dubbed TSQ) for anti-interference reception, and "Inclusive Noise Compression" noise suppression. The 4000DX offers two dual tuner diversity receivers and an integrated antenna combiner; the 2000DX has a dual tuner diversity receiver; the 900DX is a single tuner. Prices range from $650 to $1,250.

SEE MANUFACTURER CONTACT LIST ON PAGE 23.

Software

Is Cakewalk Professional a bit too much sequencer for your needs? Maybe you should check out **Cakewalk Express**, Twelve Tone Systems' latest addition to their popular line of sequencers for the PC. Express, priced at only $89, is designed for the home music enthusiast. Users can record, edit, and play back music without an external MIDI device; all that's required is a Windows-compatible soundcard. (You can, if desired, use the included soundcard MIDI adapter to talk to external devices.) The software supports the playback of digital audio files, MCI commands, and Video for Windows .AVI files, allowing you to add sound effects, animation, and video to your music tracks.

Winjammer Software recently released version 4.0 of **Winjammer Professional** ($199), a MIDI sequencer for Windows that the company modestly proclaims to be "the friendliest and most powerful multimedia sequencer." Normally we put new software revisions in our "Updates & Options" section, but we completely overlooked the Winjammer in our December '94 Music Software Buyer's Guide — oops. By way of apology, here's a rundown of the program's capabilities: 64 tracks, 16 MIDI output ports, up to 768 ppq resolution, cut/copy/paste track and song editing, piano roll editing, event editing, graphic controller drawing/editing, notation scoring and printing, programmable faders, support for .WAV files and MCI commands, SMPTE sync, pattern (groove) quantize, and jukebox-style playback of multiple files.

Digital Musings

QSound Labs has announced the **QXpander** plug-in for use with Digidesign's Sound Designer II, Pro Tools, and Session 8 systems for the Mac. The software, which uses QSound's patented localization algorithms, is a professional-quality sound field expander that extends the perceived soundstage beyond the physical positions of the monitor speakers. Introductory price: $295; $395 after March 31, 1995, plus $25 shipping.

While were talkin' Digidesign, the company has announced that the software plug-ins from Apogee Electronics, Arboretum Systems, Crystal River Engineering, Jupiter Systems, Lexicon, the aforementioned QSound Labs, and Waves will all be compatible with TDM and the new Pro Tools III system. Similarly, MIDI sequencing/digital audio packages from Emagic (Logic Audio), Mark of the Unicorn (Digital Performer), Opcode (Studio Vision Pro), and Steinberg (Cubase Audio) will also be supporting the system.

Now Shipping

We gave you a sneak preview of Akai Digital's **DD1500 digital audio workstation** in the January edition of Interface. At the time, there were no prices set: Now we're back with a second look. The basic 16-track system, which includes the mainframe, the controller, the SMPTE/EBU interface, biphase sync, video sync, RS422 machine control, DSP, four analog inputs and outputs, four digital inputs and outputs, and 16Mb of RAM runs $17,825. The expanded system, which offers 12 analog and digital inputs, 16 analog and digital outputs, 16 channels of real-time EQ, and 64Mb of RAM, runs a cool $26,250. A basic DD1500 can, of course, be upgraded with a variety of options, including analog inputs and outputs (set of four, $1,570), digital AES/EBU I/O (four channels for $550), 1.3Gb MO drive ($5,475), 16 channels of real-time EQ ($780), and RAM ($615 per 8Mb). We suggest buying the basic system for your loved one's birthday, then surprising him or her all year long with upgrades — a couple of extra inputs for Christmas, some EQ for Valentine's Day, and maybe an MO drive for that moment when you really want to tell that special someone just how much they mean to you. . . .

NAMM Preview

We know this issue won't hit the newsstands until *after* the January '95 National Association of Music Merchants convention in Anaheim, but we're writing this in mid-December. Such is life on the MIDI infobahn. . . .

If you've ever tried playing strummed guitar parts on a MIDI keyboard, you know just how difficult it is to make them sound convincing. The **Digitar**, from Charlie Lab (U.S. distribution by RiCharde & Co.) makes it a snap to create realistic sounding guitar parts. You simply plug the Digitar (projected price, $449) into your MIDI keyboard or sound module, dial up a guitar sound, and strum away on the unit's "strings" while holding down the desired chords on the keyboard (or play them from a sequencer). The hip part is that you don't need to know anything about guitar voicings; the Digitar has the ability to read simple three- or four-note chords and automatically generate the proper voicings (it can also read your fingering directly). Programming modes allow fret noise, thumps, palm mutes, and so on to be added to the sound.

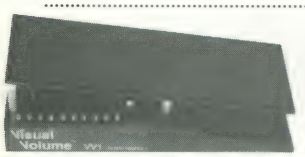
The Italian company Viscount (U.S. distribution by American Keyboard Products) will be introducing three new products (prices unavailable at press time). The **RD-800 Active Data Filer** is a Standard MIDI File recorder that allows edits, such as transposition, block repeat, and track muting, to be performed on the file. The **Maestro MIDI Notebook** can display lyrics, MIDI data, and chords in either keyboard or guitar format (plus inversions), in sync with the playback of Standard MIDI Files. The **MF-01 Song Worker** combines many of the functions of the RD-800 with a General MIDI tone module that features 28-note polyphony, 355 sounds (including nine drum kits), and 16-way multitimbral operation.

Voce, makers of the Micro B II organ module, will be displaying the **V3 professional organ module** (price to be announced). The unit, which is designed to emulate Hammond B-3 sounds, features real-time drawbar capability via MIDI, an effects loop and stereo output for the rotary speaker simulation, tube-style overdrive, speaker cabinet simulation, EQ, non-volatile patch storage, and multitimbral operation.

Pedalmania

Ever try to use an expression pedal from one manufacturer with the keyboard of another? Sometimes they work, but more often they don't. If you're tired of taking chances, check out the Rolls **RFX402 stereo volume pedal** ($50), which also features dual CV outputs, allowing it to do double-duty as an expression pedal. Two CV formats are supported, making the pedal compatible with a great majority of keyboards and MIDI pedalboards that accept CV input.

It's always been problematic to get a good rock guitar sound in a home MIDI studio, as there's rarely enough space to set up an amp and crank away. The Morley **JD-10 overdrive/distortion pedal** may be the answer. The $198 unit can function as a speaker simulator, humbucker emulator, pre-amp, EQ, line driver, and headphone amp; its output can be fed directly to tape, thereby eliminating the need for an amp and mic.



The Slide Music Company has released **Visual Volume**, a pedal that uses LEDs to provide a visual cue as to the pedal's setting. The pedal features studio-grade slide pots, two inputs, two outputs, and a direct output for connection to a tuner. $139.95; for a limited time, available direct for $89.95.

From Kenton Electronics in the U.K. comes the **GS8** and **GS2 MIDI switching units**, designed for guitarists who want to control their effects pedals' configuration and amplifier footswitch settings via MIDI. GS8: £212.75; GS2: £140.38.

SEE MANUFACTURER CONTACT LIST ON PAGE 23.

Soundcard News

E-mu Systems has released the first in their series of **SoundFont** banks. In case you've been living under a rock for the past while, SoundFonts are banks of samples that can be downloaded into compatible computer and multimedia platforms, such as Creative Lab's Sound Blaster AWE32 (reviewed in our Oct. '94 roundup). The library presently includes musical instruments (7' and 9' grand pianos, B-3, rock guitars, drums, assorted woodwinds, and world instruments) and "haunt fonts," a set of scary instruments and assorted ghoulish sound effects. Sets are $29.95 each, with all seven sets for $179. E-mu plans to release ten to 20 additional fonts on a monthly basis; a CD-ROM of fonts is planned for early '95.

For the user interested in customized sounds, Creative Labs (E-mu's parent company) is offering the **Vienna SF Studio**, a software package for creating, editing, and downloading sounds into the AWE32. Utilizing SoundFont technology, Vienna SF allows manipulation of volume, pitch, timbre, tuning, and effects, as well as supporting multisampling and layering. The new software will be bundled with the Sound Blaster AWE32, and available as an upgrade (for a mere $13.95) for AWE32 Value Edition owners.

Ensoniq announced the availability of the **Soundscape Daughter Board**, which allows 16-bit FM soundcards that have a 26-pin audio expansion connector to be upgraded with the same wavetable ROM found in the company's Soundscape soundcard (see review, Oct. '94). Ensoniq also announced that the Soundscape is now being included in Human Machine Interfaces' **Sound Operating System**, a digital audio development tool for MS-DOS.

Title Talk

The Music Game, from Microforum, is an interactive CD-ROM "edutainment" game designed to make it fun to learn music theory. Featuring state-of-the-art animations, over 1,000 music samples, and over 200Mb of "celebrity" voice clips (including keyboard notable Oscar Peterson), the Music Game covers such basics as the grand staff, sharps and flats, note/rest values, common notation, keys on the piano, basic fingering, rhythm patterns, time signatures, and dynamics. There are also sections on orchestral instruments/families, classical composers, MIDI, and electronic keyboard instruments. Up to four users can play at once, or you can "compete" against the computer. The downside to what otherwise sounds like a fun product: Presently, the Music Game ($39.95) is only available for the PC, meaning that Mac users will have to learn their theory the old-fashioned way — either that, or become drummers. (It's a joke, okay? A *joke*.)

Intersound Multimedia has a new interactive CD-ROM for PC called **Record Producer**, in which you can create "original" versions of hit records — sing your own vocals, change tempos and styles, mix different tracks, and so on. The $69.95 disc comes with six hits — including that all-time classic, "Achy Breaky Heart."

Geffen Records is now playing in the CD-ROM game arena. Their debut title: **Vid Grid** (PC), in which the user must unscramble a divvied-up music video before the video ends. $34.95, and undoubtedly worth every (*yawn*) penny.

Piano Notes

Baldwin is introducing a new line of digital pianos that will feature sound enhancement electronics by Barcus-Berry (a.k.a. BBE Sound), makers of the BBE Sonic Maximizer product line. A number of companies have licensed BBE technology for use in their products, but Baldwin is the exclusive licensee for the home digital keyboard instrument market.

Proving that you can't have too many bases covered: BBE just announced the **4000N Planar Wave Pickup System**, designed to provide an efficient, high-quality, low-cost solution for miking acoustic piano. The $299 system consists of a control unit and a small pickup that attaches to the piano soundboard using an easily removable adhesive. Features include full-spectrum frequency response with even response across the keyboard, high isolation and signal-to-noise characteristics, high- and low-Z outputs, and approximately 2,000 hours of battery life (power is provided by a standard 9V battery). Despite the pickup's small size (about 2-1/4" x 1"), reportedly only one is needed for optimum response.

With sister themes of "No room for a grand piano?" and "Can't play a note?" Yamaha kicked off the campaign for their new compact "room-friendly" **DA1 Disklavier grand piano**. The instrument's small size is touted as a solution for apartment dwellers who don't have enough room for a grand piano, and its player-piano capability is aimed at those whose chops perhaps aren't a match for the pre-recorded 3.5" floppy stylings of Chick Corea, Peter Nero, and George Gershwin, to name a few of the available PianoSoft artists. Our favorite quote from their literature: "After dinner, perhaps over cappuccino, you might like to hear some current show tunes. . . ." With its $23,995 price tag, this hideaway/no-play is obviously designed for those who live in luxury apartments. (Cappuccino not included.)

Young Chang is introducing the **U-131 52" upright piano** (ebony finish, $5,940; walnut finish, $6,180), which features a maple soundboard liner for enhanced tone. This is undoubtedly going to be a bigger success than the earlier U-13.1 5-1/2" model, which had a soundboard lined with maple syrup.

Sound Bytes

Digital Informative Data: Ultrason K2000 (Kurzweil K2000): Vol. 1, Retro Textures, $34.95; Vol. 2 VAST Future, $34.95; Vol. 3, 70mm Adventure, $49.95. WaveSeries (Korg Wavestation): Vol. 4, Avant Garde Textures, Part 2, $29.95. Ultrason TG500 (Yamaha TG500 and SY85): Vol. 1, Studio Selectives, $34.95. UltraBeat (E-mu Procussion): Vol. 2, Studio Stacks, $34.95. All titles available on Mac, PC, and Atari ST/TT/Falcon disks with self-loader program.

Syntaur Productions: Now distributing Ensoniq's SLT libraries for the EPS/ASR family of samplers. Thirteen ten-disk libraries are available, from contemporary to classical to sound effects, plus two sets covering the entire Mirage sample library; $74.95 per set plus $4 shipping. Syntaur is also now distributing the complete Casio sound libraries for the VZ series synths and the PG-380 guitar synthesizer. Sounds are available on disk in Mac, PC, Atari, and Alesis Datadisk. Casio RC-100 – RC-150 libraries (128 single and 128 operation patches each), $39.95 per set; PG-380 libraries (128 single patches each), $39.95 per set; VZ-1 and VZ-8M (64 single and 64 operation patches each), $29.95. All orders should include $4 shipping.

The Lauriston Report

The Infamous Pentium Bug. If you've bought or have been considering buying a PC with a Pentium CPU, you've probably heard the news about a bug in that chip. Most news reports haven't described the bug very accurately — not surprising since the only people who can really understand it are hardcore computer geeks, few of whom are capable of explaining technical matters in plain English. In a nutshell, when performing a few specific types of calculations (notably division) on specific pairs of long numbers, the buggy chips give an answer that is off by a tiny amount. For example, 4,195,835 divided by 3,145,727, which (rounded off to four decimals) *should* be 1.3338, is calculated by the Pentium as 1.3337 (about 0.006% short of the correct answer).

According to Intel, only around one in nine billion pairs of numbers is calculated incorrectly; IBM (not exactly an unbiased source, since it is manufacturing Pentium clone chips for NexGen and Cyrix) claims that the number is more like one in 100 million. This is a very serious problem for some users — you wouldn't want to design an airplane or trade margins in the international currency markets with a buggy Pentium. But most PC users will never encounter the bug, and don't do the kind of work where such slight inaccuracies would be a problem.

Software patches to fix the bug are available for downloading from CompuServe and other on-line services.

New Macs. In a oneupsmanship move against Intel's 100MHz Pentium, Apple Computer has introduced the **PowerMac 8100/110**. The new top-of-the-line model uses a 110MHz, clock-tripled version of the PowerPC 601 CPU. The $6,379 (ouch!) standard configuration includes 16Mb RAM and a 2Gb hard drive. Beyond those two items, it's the same as the 8100/80/CD, except that Apple has fixed a problem in the Nubus slots' burst mode that caused problems with some high-end digital video boards.

By the time you read this, Apple is expected to have upped the clock speed on the cheaper PowerMac models as well, with the introduction of the **6100/66** and **7100/80**.

Tiny CD-ROM Changer. Tired of having to fumble with jewel cases and caddies every time you want to swap CD-ROMs? Relief is on its way from Panasonic/Matsushita, which will start selling a five-disc changer (price to be announced) later this year. The quad-speed unit will switch between discs automatically in a reported maximum of three seconds. Instead of using a cartridge, the caddyless drive gives each disc its own eject button. The unit is the size of two regular CD-ROM drives stacked one on top of the other, so it can be installed internally in systems that have an empty full-height drive bay. *—Robert Lauriston*

Updates & Options

Hammond/Suzuki: **Version 2.0 for the XB-2** adds over 25 new features/enhancements, including programmable rise and fall times for the Leslie simulation, independent upper/lower manual pitch-bend ranges, 16 volume levels of percussion, MIDI transmission of drawbar changes, expanded memory for preset banks, and a host of MIDI functions. A number of other enhancements, such as percussion key-tracking, have been made that allow the XB-2 to more accurately recreate the characteristics of the original B-3 (contact dealer for price).

Jump! Software: **Version 1.5 of Concertware** is now available for both Macs and PCs running Windows. New features include an on-screen keyboard and transport controls. V. 1.5 comes bundled with the CD-ROM tutorial "Making Music." $159.

Contacts

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QSound Labs: 2748 37th Ave. N.E., Calgary, Alberta, Canada T1Y 5L3. (403) 291-2878, (213) 876-6137 (Los Angeles); fax (403) 250-1521.
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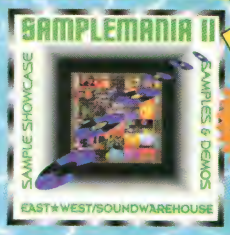

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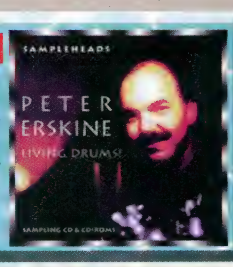

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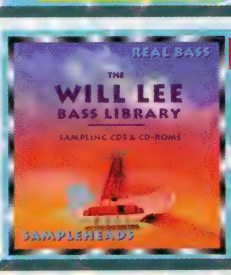

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thomas dolby

Years after being blinded by science, Thomas Dolby has a clear bead on the future. His sights are set on the workstations at his Headspace multimedia firm; his tours lead him not to airports and hotels but toward electronic apparitions that line the Infobahn. Dolby's itinerary points inward now, into those realms of imagination that today's musical tools can unlock.

Picture, for example, a city filled with human drones and lifeless androids. Somehow one robot decides to flee this sprawling Ginza. He sails through neon coronas and between towers of steel and glass, and dives into a maze of cyborgian sewers. It's not clear what Mr. Silicon is looking for, but he probably wasn't expecting a reverse replay of the Big Bang, which is exactly what he finds behind one nondescript door.

This little surprise is just one of the highlights of *The Gate to the Mind's Eye*, a 50-minute exercise in virtuoso computer animation and the third in a series put out by Miramar. (The previous titles, *The Mind's Eye* with music by James Reynolds, and *Beyond the Mind's Eye*, scored by Jan Hammer, are available on video and CD from Miramar.) Stunning images flow throughout *Gate*: A sinuous tiger prowls a barren terrain, whales cavort in slow motion through deep green seas, light illuminates hieroglyphics and shadows deepen the features of statues in an Egyptian temple. There's a continuity here, in the same sense that dreams thread together: The story is enigmatic but by no means chaotic.

Or so it seems, thanks to Dolby. *The Gate* consists of a series of videos, each one independently produced with no foreknowledge that it would be included in this package. With the sound turned down, the differences between them are evident. But with Dolby's score playing, a sense of unity pervades. It's a tribute as much to the efficacy of music as to the wizardry of animation.

The projects now being pursued by Dolby reflect similarly contemporary priorities. He professes nostalgia for the days when he took his act on the road, whether busking on the streets of Paris or rocking the Grammys ten years ago with Stevie Wonder, Herbie Hancock, and Howard Jones in an Olympian synth quartet. But Dolby's present is the future, framed on a video screen. Issues today involve not the logistics of ►

INTERVIEW BY **JIM AIKIN** & **ROBERT L. DOERSCHUK**
STORY BY **ROBERT L. DOERSCHUK**

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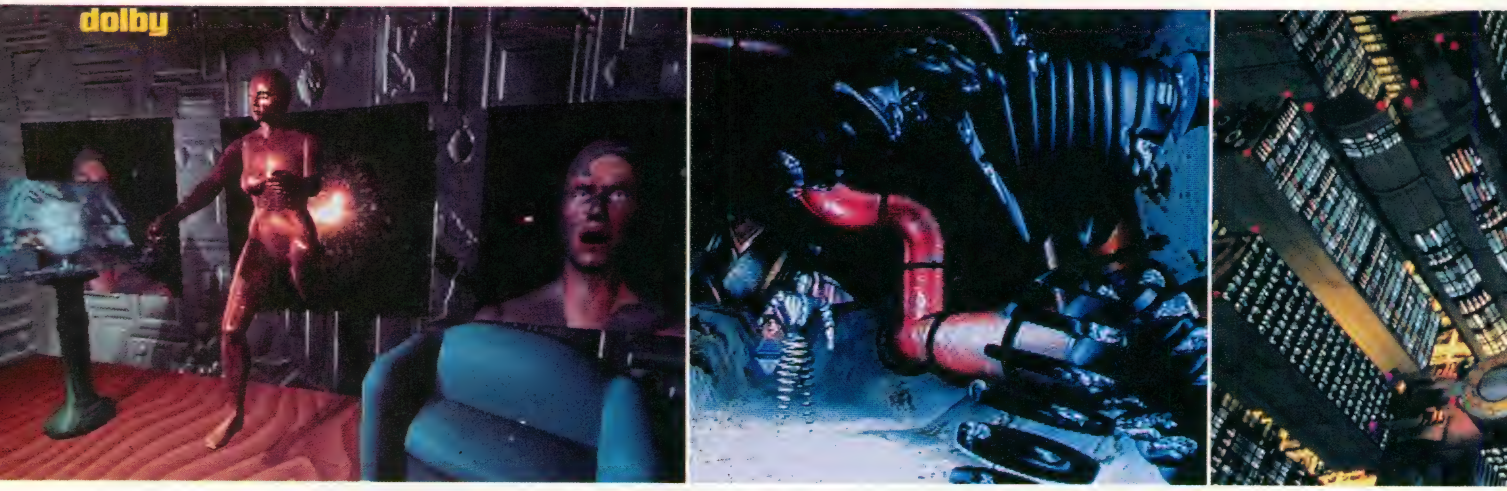


Groundbreaking video images from The Gate to the Mind's Eye, *for which Dolby scored the soundtrack.*

◄ touring but the stationary epiphanies of virtual reality. Forget about building a better mousetrap; the new challenge is to build greater interactivity into video games.

As the head of Headspace, a gaggle of composers, sound effects designers, and other professional visionaries, Dolby has taken on several high-tech assignments over the past couple of years. He was behind *The Virtual String Quartet,* the first VR classical music performance, which premiered in Oct. '93 at the SoHo branch of New York's Guggenheim Museum. Two months later, *Double Switch,* an interactive movie starring Debbie Harry, was released with a Headspace score. Last Christmas, Interplay released *Cyberia,* a CD-ROM game whose audio side was created by Dolby and his staff.

And there's more: sound design and music for The Dive, a theme eatery opened by Steven Spielberg, Jeffrey Katzenberg, and Levy Bros.; three ride simulation films scored with Machine Head for IWERKS; and a new generation of video game software, which Dolby calls AVRe (the Audio Virtual Reality engine) and conceives of as a means of allowing players unprecedented control over the traditionally limited and repetitive music that accompanies video games.

Passing on virtual burgers at The Dive, we invited Dolby back to the corporeal world for a byte — sorry, bite — and a talk about where he, and a new generation of electronic artists, are going.

How did you make the initial connection with Miramar?

I went to a screening of the Jan Hammer *Beyond the Mind's Eye* in Los Angeles, and got talking with the director, Mike Boydstun. We exchanged cards, then six to ten months later he called me and said he was beginning to put together the third one and was interested to know what my approach to it would be. He was concerned that they should keep the style of the first two for reasons of continuity, but he was also concerned that they shouldn't be accused of sameness, so he wanted to push the envelope a little bit. He asked how I thought he could best do that. I said that, much as I like Jan's music for *Beyond the Mind's Eye,* I felt that the format was very much like eight or ten MTV videos: four or five minutes of a groove, with everything cut into that. I felt that it might be more interesting to go with a cinematic dynamic — in other words, tension and release, with some quieter passages that allowed the graphics to breathe a little bit. We discussed what his options were when it came to editing the material that had been submitted to him. He said that very often his options were limited because computer graphics people don't think like cinematographers. They tend to make one continuous master shot, where the camera sort of starts in that corner, flies around over this bowl of fruit, and ends up over there. There are no reverses, nothing to cut away to. So your options are limited: You either stay with the shot for its entirety, or else you cut away from the shot. I felt that might be a problem, if you had a constant, pumping, adrenaline beat. If the pace was a little more like a film score, it might be possible to get away with using some of the nicer shots in their entirety.

Who put the visual side together?

It was actually the output of more than 50 studios from around the world over the previous two years. All of it was intended for other usage, such as commercials, ride simulations, game intros. Some of them were just academic exercises done at universities. In the case of some of the architectural pieces, several European arts councils had commissioned CGI reconstructions of old buildings. For example, there's a piece based on the cathedral at Cluny that had fallen down 400 years ago. The French government commissioned a reconstruction of the Cluny Cathedral in VR. They still had the original plans, so if you go to the site as a tourist, you can put on VR goggles and actually move around the cathedral.

So The Gate to the Mind's Eye *wasn't conceived as a single project?*

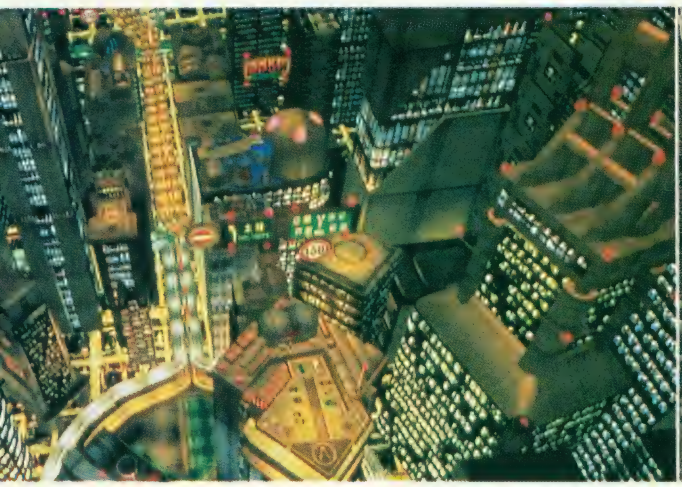
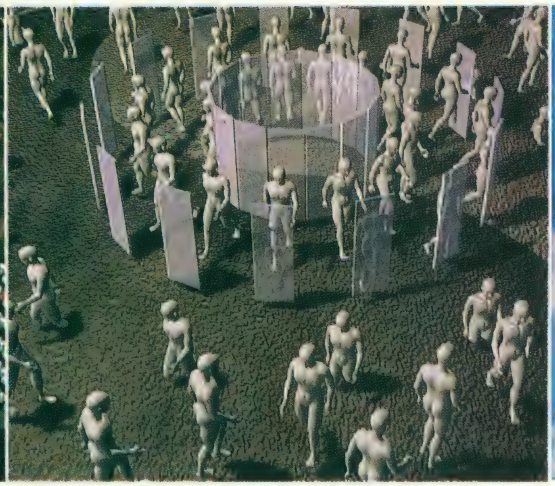
That's right.

Yet there's such a sense of flow throughout the film.

Well, number one, Michael is a brilliant editor. And number two, we went to great lengths to use the sound to smooth over some of the stylistic inconsistencies. This is the first *Mind's Eye* video that's had a full sound design job. In fact, two of the Headspace sound designers worked pretty hard to come up with some sort of creative sound effects applications. In a lot of instances, if you watch the piece with the sound turned down, you might notice a bit of a jump between one shot and another. As an example, there's one scene where you have a forward POV [point of view] flying in some kind of a craft down a crowded Tokyo street. Then you cut from that to a back alleyway where these chrome androids are running from an angry mob. During the forward POV shot in the streets, we brought in a kind of a megaphone voice that sounds like the android police ordering them home for curfew. It's prelaid over the cut, so you've had a few seconds to get used to it before we cut to it. It tricks you into feeling you're in the same time and place.

So a lot of your work involved smoothing over transition points.

Yes. The trick, when we started work on the project, was to try and provide a narrative flow. When I first went up to Miramar in Seattle and looked at the material with Mike Boydstun on his AVID [digital video editing system], I was very pleased to see that there was a high proportion of cultural/architectural/historical material, versus the sci-fi androids, space ships, and so on. There were also some new textures in there, like watercolors or works on canvas, which was great because my notion of CGI was that it was generally very acidic. Of course, there was a lot of POV flying-around stuff and sci-fi things — utopian cities, weird androids. That was also what turned people onto the first two tapes, so we weren't going to able to get away from that. But we hit onto an idea for a different structure when Mike explained to me that with these POV shots you really had very few options other than to run them backwards. He hit a switch on his AVID and ran a shot in reverse. Earlier on, he had shown me an animation of the Big Bang. I said, "What would the Big Bang look like backwards?" We checked it out, and it was kind of great; it was like the universe imploding on itself and going down to black. At that point I heard this sort of cosmic wind in


my head, and I thought, "Ah! I've got it. What if we come up with a story that civilization destroys itself and is reduced down to nothingness with a few seconds of cosmic wind, then it explodes again, and after that everything is beautiful?" That gave us a way to concentrate the sci-fi stuff into the first ten minutes.

Unlike your other solo albums, The Gate to the Mind's Eye *mixes songs with extended instrumental sections. How would you decide which of these approaches worked with specific passages of the video?*

It was actually quite hard. On the previous *Mind's Eye*, the tapes were purely instrumental, though not using the film approach. It's almost like they were instrumental pieces that had been cut to the groove. So I had to be fairly cautious with sneaking some vocals in. In the opening piece, "Armageddon," it was natural to have a rather foreboding and mysterious vocal, rather like in the opening of *Blade Runner* [where] you might hear a strange, off-world, Asian voice, maybe emanating from a huge electronic billboard. So that was appropriate. But once we had established the more filmic approach to the scoring, the piece after "Armageddon," which starts off with an Australian flute and solo piano, made it much harder to sneak a vocal back in. I had songs I wanted to do, but I didn't want the songs to distract from what was going on. In the case of both "Valley of the Mind's Eye" and "Nuvogue," I wrote specifically for the picture.

What kind of interaction did you have with Mike Boydstun at this stage?

He was working on his own on the AVID, and I was working pretty much on my Mac. It was possible for us to make very large, sweeping changes. I would call him up and say, "You know that space station sequence? How would that look right after the tiger?" He was just cutting and pasting this piece, and he'd say yea or nay. Simultaneously, I was taking the entire music track and moving it around. Because it was a team of two in the authoring process, it was possible for us to make some very large-scale changes very quickly. In a more conventional movie project, there's a much larger team of people and this narrative that you have to tell, so it's harder to make those kinds of changes. With us it was more of an iterative process. Based on the pieces he sent me, I would settle on a tempo, do a very rough version of a piece, and send it up to him. He would adjust a few things here and there, then send it back to me. This went on through several alterations. It was very hard to actually pin down the final cut. He would send me a videotape and say, "This *is* the final cut." I'd go, "Okay, if you're *sure*, then I'll do my final mixes to it." I'd do that and send it back to him, only to find out that he had tweaked a couple of things. I'd say, "Let me see it!" In a couple of cases, he let me remix to the tweak. It was actually a plane ticket to Europe that made me draw the line and say, "It's done."

How long did the project take?

From start to finish, it was four or five months. The concentrated work was in the last three. When I actually got into a mixing studio, I had 30 days to mix the entire show. It was further complicated by the fact that we couldn't just mix down to two-track. We were actually mixing to a Tascam DA-88, the reason being that we had to keep the sound effects and the music separate to do Dolby surround mixes for the laser disc. It was also complicated by the fact that when you have long pieces, all of which have sound effects, they had to overlap. They weren't cross-faded; they were actually cut into each other. It was way too much to take on to mix the whole ten minutes in one fell swoop. So, using the DA-88, we did what you might call a pre-dub. We mixed "Armageddon" to two tracks, then we mixed the third piece to two tracks, and then the middle piece to two other tracks, and the sound effects all the way through to two tracks. Then we made a further dub of the eight tracks. In some cases, if I needed to

At work in Headspace with the essential tools of the composer's trade . . . and what's that silly archaic thing behind him?

remix, I'd go back and remix one passage. A few other curve balls were thrown in too, like the fact that some of the graphic pieces hadn't been legally cleared by Miramar's business affairs department, so I had to wait until the end to do this.

When I realized that I had 30 days to finish the thing, I decided I'd have to draw up a map of how to do it all. I gave myself a full day for "Armageddon," two days for this piece, and so on. If I got even one day behind, I would be basically screwed. On the last morning I had a plane out of L.A. at 8:30 in the morning, and at 7:15 I was still desperately trying to pull the kettle drums in one of the pieces into time. I'd been up all night, and they still sounded way out of time. There came a point where I said, "If this isn't it, I'm gonna miss my plane." I had to walk away from it knowing that it was not as perfect as I would like it to be.

Obviously you have a wider selection of sounds to use than you did at the time of your first album, yet the same aesthetic endures even on your most current work. For example, you've always enjoyed floating free piano extemporizations over synth backdrops, and the character of those piano sounds hasn't changed much since The Golden Age of Wireless.

Well, a keyboard player recently pointed out to me that the Roland MKS-20 is very much my distinctive piano sound. I thought about it, and I realized that I had used it for several albums; it's been my piano module. But there's one piece on this album, "Planet of the Lost Souls," which is very exposed. There's no way I would have wanted to do that with the piano module. It's very rubato, so the benefit you would get in a strict tempo from working with MIDIed piano — the ability to move things around and edit single notes — was not necessary. If I had attempted to play a MIDIed piano rubato and then gone in to edit it, it would have been like opening a can of worms. Basically, to get a great piano sound, there's no substitute but to sit at the damn thing and go for it. The sad truth is, though, that I could have done it way better when I was 15 than now.

How much do you actually sit down at the keys and play these days?

Very little.

Is live performance a thing of the past for you?

Well, as Frank Sinatra once said . . . [*laughs*]. I absolutely adore getting face-to-face with the audience. Over the years, I've actually enjoyed it more and more, to the point where on the last tour I did, I completely gave up on any desire to reproduce what I'd recorded on my albums. I found a band of musicians I liked to play with, whose playing I enjoyed, who I liked as people, and I said, "Let's do our version of this song, whatever it might be. If it's missing a sound or a part, too bad." I sat at a piano, played and sang. I had another keyboard player who covered a lot of the synth parts. We kept the shows very loose: The set list and the structure of the songs changed night to night. I got so much out of that tour, versus 1983, when I toured and everything had to be as per the record. We changed things around, but if I needed a sound and we didn't have the ability to get it, I would add another keyboard and someone to play it; it just had to be there.

The problem with electronics in large performance is that every element has no knowledge of the other elements. So some nights 120 beats per minutes would feel way fast, and other nights it would feel way slow. I would strain under the knowledge that the show had to go on because the video would be out of sync or the samples wouldn't match up if I dared change anything. When musicians play acoustic instruments together, they adapt in real time to issues of tuning, sound mix, the atmosphere in the hall.

Several of the pieces on Mind's Eye *could be categorized as pop songs. Do you still see yourself as a pop songwriter?*

That's hard to answer. Whenever I do an album, I'm always very aware that I need to make it deliverable. If I'm doing the soundtrack to *The Mind's Eye*, I think of somebody going to a video store, renting it, and putting it on. I think myself into that situation and work backwards from there. I start with this empty space and try to fill it. If I'm writing a pop song, as you might say, I think of driving along in my car and listening to the local pop radio station. I'm not enjoying it very much, but then this one thing comes on and I go, "That's kind of cool. It's great that this station would play this." And I'll work backwards from there. Artistically, I set a higher standard for myself. That came about with *Astronauts and Heretics*. There are songs on my first album that are quite introspective, but often it's not really me talking; it's this imaginary character, in sort of a novelist's approach. But the songs on *Astronauts and Heretics* are very much in the first person, very autobiographical. A lot of the sentiments that they contain are directly from my experience. I set a standard for myself with that album, so if I'm attempting to do a serious song these days, it has to come from inside.

I make a definite distinction. For example, if I'm looking at the graphics in "Nuvogue" and I decide to do a sort of Cab Calloway feel for it, I know I'm just flexing a muscle. It's like, "Let's have fun with a particular style. We'll get some musicians in and relish the sound of a three-piece brass section." But I'm not really expressing something that comes from inside.

Why did you go with real horn players on that track, rather than synth horns?

Bluntly, time. The nice thing about a tracking date, where you're trying to capture the whole sound in a single take versus building it brick by brick, is that you get these guys in the studio, you get a real drum kit and a brass section and a piano, and everything is miked up, and they play through the song a little bit, and it sounds absolutely . . . *dreadful*. It sounds dreadful for a number of reasons: They don't know the parts yet, their chops are not warmed up, the mikes are not positioned right, maybe the mike preamp is not quite right, the compressor is overloading. With a good engineer, you can get right to the source of each problem. Over the course of a session, you're looking at your watch, you're worrying about the amount you're going to have to pay these guys, and so on. But you're honing in on the essence of a piece of music, and finally there comes this point where you go, "We should tape this." And you know that from there on, any one of them might be the take.

You end up with maybe four or five. You get the guys out the door, you say your goodbyes, then you come in, disassociate a minute, and listen to the four or five takes you've got. And one of them is the song. Once you make the decision that this is the one, you don't zero in on the kick drum sound or how in time or in tune a given note is. Chances are, if it's the one, it's because it all came together. Everybody was hearing everybody else, and they were familiar enough with the piece, and between them they made the definitive version.

The problem with the building-block method is that each of these elements has no knowledge of any of the other elements. There's no reciprocation, no real feedback. As the programmer, it's up to you to tweak and tweak until everything looks finished.

On this particular tune, though, isn't there a dichotomy between the live feel of real musicians and the robotic nature of the visuals?

To be perfectly honest, I didn't like the visuals

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for that piece. I felt that they needed to be enriched. That's another reason why we went for the real musicians.

The purely electronic settings throughout the album, particularly in the opening section to "Planet of Lost Souls," are even more expressive than the live ensemble passages.

I'll tell you a story about the orchestral sounds on that piece. Maybe a year ago, a person at Yamaha promised me a VL1 to play with. Since then, I started writing these flute, oboe, and saxophone parts because I knew this VL1 would show up. I did it with the first sounds I'd find. I'd take a Morpheus [E-mu], flip through the presets until I found a flute, and I'd go with it to put the piece down, knowing that sooner or later the VL1 would show up and I'd do this thing really beautifully. Well, the VL1 never came, and time ran out. At the end of the day I realized that I'd have to stick with the Morpheus. It was rather a terrible realization.

In addition to this album, you've been planning video games with music that's more responsive to player activity.

Well, I think that the big change [in new generations of video games] is that the decisions you make as a player will impact the experience you have in a big way. I'm a big fan of Myst, for example, but everybody who plays it has more or less the same experience. To me, the most exciting interactive products are the ones where every twist or turn that you take has been loaded with information.

Even for users who are not musically knowledgeable, some of the first-generation algorithmic composition software theoretically allows users to make high-level interactive decisions, yet we haven't seen this sort of software yield very interesting musical output. Do you see something more promising on the market?

I haven't seen anything, but I am developing stuff along this line. If you've ever seen Tangerine Dream play live, their music has a sort of momentum, and every now and then somebody will lean forward, twiddle a knob, and open a filter or something like that. In a way, their input is to modulate something that's already there. A step above that is the conductor of a symphony orchestra: The notes have been written out on the page, and the musicians have been trained all their lives to play their instruments, and the conductor has rehearsed with them, yet on any given night the conductor can bring a piece to life, and the audience is involved in that; the performance would not have resulted under different circumstances. Then a step above that would be to give the conductor the ability of using these crude arm and body movements to leap around within a composition and respond to something he was seeing. For example, if he was conducting an orchestra to accompany a silent film he had never seen before, and he had enough vocabulary in his style and his relationship with the orchestra that he could actually improvise with an entire orchestra in response to what he was seeing on the screen. That would be more exciting again.

We've all grown up with music that enhances film and TV. In a lot of ways, the composer in that situation is matching the filmmaker's art with music, or taking a linear piece from Point A to Point B. He tries to manipulate the audience's emotions by writing cues that tell them what to feel, even subliminally. Having done a couple of film scores, I've learned that you go through this weird process where you've read the script, and you realize that you've got to write five or six main themes — the love theme, the bad guy theme, an action/adventure cue. It makes sense to be economical and recycle them as much as possible, not just for the sake of economy but because the audience becomes familiar with the material.

It gives the film a certain unity.

Also, if you've only got the orchestra for a couple of days, once they've learned the love theme, if you give them five different cues with that same theme at slightly different tempos and different keys, they can whip them off very quickly. Maybe you write these five themes at the piano after you've first read the script. Then the director comes over one day, and you say, "How's this for the love theme?" He says, "Yeah, that's great." Then a week later, he comes over with the first rough cut. You say, "How's that scene where they kiss on the mountainside?" "Oh, that's gone. Page 48 happens here instead." So you're watching this cut, which is very different from what you've anticipated, and in your head you're trying to juggle these things that you've written. You still want to do the right piece of music; you want to adapt the composition that you've already done. But now there's all these changes. A crafty composer will be able to do that.

I felt that in order for music to enhance a real-time interactive experience in the same way, it requires software that would do that part of the composer's craft, to take prearranged themes and adapt them to the circumstances of a given scene: What's going on in this scene? What's the mood? Where's the dramatic and emotional tension?

What does current technology allow to be changed?

At this point, very little. That's something I'm trying to solve. If you describe a scene from a game to a composer, he'll go away and write a piece of music for it. You put it in the game, then bring him down one Saturday afternoon to watch these kids play it with his music running. He goes, "If I'd known they were gonna do that, I never would have written that piece of music." He could probably adapt what he wrote quickly to the way they're playing the game. That kind of syntax of little devices that a composer has is actually quite predictable; you can actually tie them down in terms of tempos, key changes, and instrumentation changes.

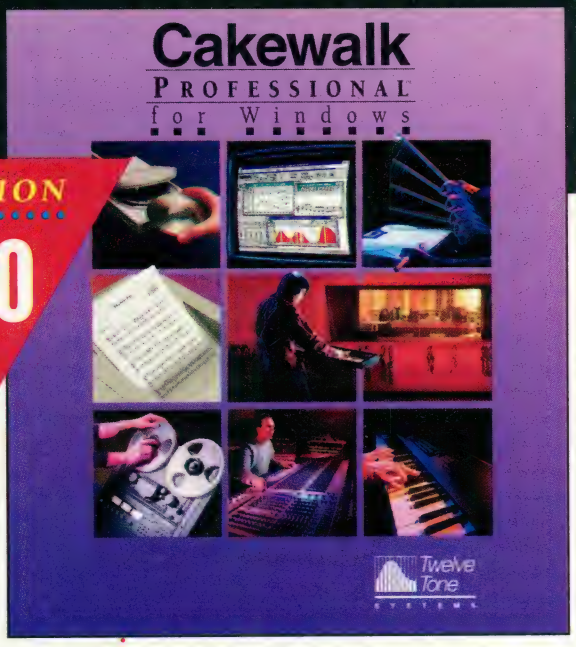
But the conductor analogy falls short in the sense that he or she has presumably devoted years to understanding the craft. Fifteen-year-old kids playing a video game are probably not concerned with understanding how their gestures affect the music.

Well, it's a chicken-and-egg situation, because no tool is available to do what I'm asking. This also restricts what a game developer can attempt. If you said to Steven Spielberg, "Sorry, Steve, there'll be no score on your next movie," then you're going to severely restrict what he can bite off. When he was composing his long shots for *Schindler's List*, he hadn't yet heard the John Williams score, but because of his relationship with John Williams he knew the magnitude of what he would be able to achieve in his filmmaking. Now, if there were to be a *Schindler's List* CD-ROM — God forbid [*laughs*] — it would be impossible to conceive without that music. So maybe you would do a deal with Mr. Williams and arrange to have your engineers get his music into the game. But chances are that if you then played the game and invited John Williams down to watch, even he would say, "If I had known that's what they were going to do, I would never have composed this or that passage."

What kind of compositional changes do you envision? Segues from one section to another? Changes of instrumentation?

Those are some of the possibilities. A film composer or orchestrator has a vocabulary of devices that can be used in different instances. That grows with experience. You get a new cut of a film, and suddenly there's eight feet gone, and you realize that instead of ending your

PLAY HARD.



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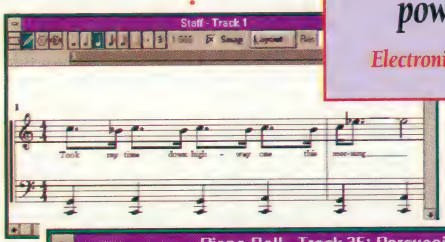

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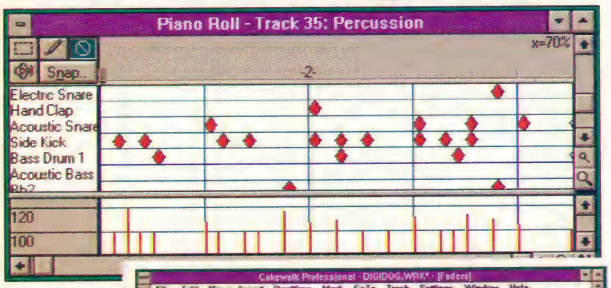

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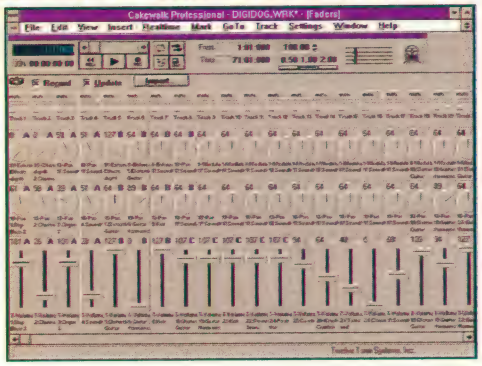

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piece on the downbeat with this long chord, you can abruptly end it in the middle. An orchestrator would quickly sketch out a full score with just an eraser and a pencil to add the changes you'd need to do that. That's part of his craft. Equally, in real-time scoring, you acquire a series of devices that will accommodate different situations. At the point where a game player can either stand and fight or turn and run, there are various things that you can and cannot do. You want it to make sense. If he happens to turn around conveniently right before the downbeat, it might be as simple as kicking the thing up by a minor third, adding ten percent to the tempo, enhancing the two percussion tracks with sixteenth-note tom-toms that had previously been muted, and so on. If he does it just after the first beat of the bar, do we wait until the first beat of the next bar? That's going to feel very slow — maybe it's just one second, but it'll feel like a lifetime. So is it acceptable to make this change on the second beat of the bar? There's no strict formula; you can't write a string of code that would deal with any of this. But you can create a set of higher-level tools that will allow a composer to make those kinds of decisions.

Are you working on something like that?

Yeah. Initially, it's just for us. Maybe down the road it could be developed for general release. There's a lot of different aspects to the technology that we're developing. One of them is purely geographical: As you move in the first person through a 3-D space, your aural perspective changes. If you move from a hillside into a cave, you'll get aural cues that tell you you're in a cave. Within the cave there may be different things that generate sound. There might be a trickling pool over here, a rattlesnake over there, and a dragon down there. As you move around in the space, these elements will change in your perspective.

It's not just a question of level. There's also some DSP in terms of the reflection of sound against walls.

Right. Thanks to the engineers, that's becoming possible. There are guys sitting in workshops and doing that kind of stuff. But then as a composer, you might take the same geographical approach. You write a theme for the rattlesnake, you write a theme for the pool. Maybe the pool has these magical Debussyesque harp arpeggios. Maybe the cave features a sort of throbbing choir sample on a *C7*. Now, here comes the dragon. If we give him a drone or a pulse on a low *A* played by strings, as we approach him, or he approaches us, we throw a new sort of light on the *C7* sense of the cave by juxtaposing another element.

All this adds up to getting more of the public more involved with music than they've been since the days before mass media began teaching us all to be passive listeners.

This has been the most passive century we've ever seen, in terms of music and performance. Now, if we were musicians who could live for a thousand years, if we were Anne Rice musicians [*laughs*], with an overview of history as centuries come and go, and we found ourselves in the twentieth century, we would feel this idea of making a recording to be kind of an imposition. I don't think that recording what we do and putting it out to these anonymous people is a very natural way to be a musician or an artist. A more natural thing to do would be to start playing and let people gather 'round. If they don't like what we're doing, we sense that and change it.

Recently you took part in the Networked Economy conference in Washington, with Al Gore, Bill Gates, Barry Diller, and other information highway cruisers. What was on the agenda?

It was a fascinating experience. *Anything* that happens in Washington has a different sort of air about it; it feels like whatever platform you're on is a rung or two higher up the ladder, especially with that collection of people. I was very flattered to be there, but I was very much the token artist. In fact, I think I only qualified because my business card says I'm president of Headspace, and on two days' worth of panels everybody was a president or a CEO. The only one who wasn't a president was Al Gore [*laughs*]. There were lots of highly politicized debates between AT&T and their European telecom counterparts.

Were you an advocate for the interests of the artistic community?

I guess my pitch was that the current explosion is mainly in the areas of technology and investment. Every day you read about some strategic alliance or corporate takeover. But if you look at history, any technological breakthrough that has really impacted a culture has come not by the actual invention of the technology but by an entertainer who has gotten hold of the technology and done something useful with it. We don't remember Philo T. Farnsworth as the godfather of modern television, but it was people like Lucille Ball and Ed Sullivan who put a TV in every home.

So your argument was that artists need to be assured of access to the information superhighway in order to continue defining the relevance of new technology.

Absolutely. In the presence of some very powerful people in companies that are laying the tarmac, I had to stand up and say, "Surround yourselves with artists and you can't go wrong, because we're the people who know how to put bums on seats." The hype meter is really pegging over at this point on the Infobahn. To my mind, it's one thing to check out a TV ad campaign that pictures people sitting on beaches and sending faxes all over the world, and it's quite another thing to deliver that and make it useful to the man and woman in the street. And unfortunately, the benefit so far to everyday people has been absolutely nil.

What significant steps do you foresee for music in interactive multimedia over the next few years?

To be pessimistic, I think that the emerging interactive game industry would be quite happy to keep shoehorning existing conventional approaches to scoring. There are three real problems with music and interactive experiences. One is that the hardware isn't yet very good at replaying music. We've gotten used to CD-quality audio through big speakers, and now we're being asked to listen to game music through much smaller speakers. Yet the game industry is bigger than the music industry at this point, so it's kind of horrible to think of all those people getting most of their music at eight-bit resolution and 11kHz sample rates through those tiny speakers. Now, that's going to improve with or without me. Every new box is going to boast better and better sound. As there's a general convergence of the kind of consumer boxes that people sell, your computer is starting to look more like your cable box, which is starting to look more like your answering machine. It's simply a matter of time before everything starts coming down the same pipeline. At that point, we'll have high-quality speakers for our audio, whether it's coming through video on demand, radio, whatever. The consumer hardware industry is going to get us to that point.

The second problem is that the game industry, up until now, has been kind of a cottage industry. Invariably, there isn't somebody in a game development group who is actually a [good] musician. Now, the chances of them not knowing a musician are very slight. Every multimedia developer is either a musician or

Thomas Dolby

A SELECTED DISCOGRAPHY

Solo Albums

Astronauts & Heretics, Giant.
The Gate to the Mind's Eye (soundtrack), Giant.
The Golden Age of Wireless, Capitol.

With Other Artists: Player

Heaven on Earth (Belinda Carlisle), MCA.
Pyromania (Def Leppard), Mobile Fidelity Sound Labs (105 Morris St., Sebastopol, CA 95472).
Walk Under Ladders (Joan Armatrading), A&M.
The Wall Live in Berlin (Roger Waters), Mercury.

With Other Artists: Producer

Desert Wind (Ofra Haza), Sire.
Dog Eat Dog (Joni Mitchell), Geffen.
4 (Foreigner), Atlantic.
From Langley Park to Memphis (Prefab Sprout), Epic.
Jordan the Comeback (Prefab Sprout), Epic.
Two Wheels Good (Prefab Sprout), Epic.

he knows one, so the tendency is for them to say, "Doesn't Jim's brother-in-law have a 16-track studio up the road? Maybe we can get 25 cues from him on a DAT, get the programmers to make the format conversion, and we'll put it in the game." That, again, is going to change with or without me. As the market increases, as budgets therefore increase, the game industry will go to Hollywood talent — directors, writers, actors, and musicians as well. There are plenty of musicians who are dying to get into it, and willing to do it for very little money. So you're going to get more and more talented composers writing for that genre.

These problems aren't really my concern, but the third one is: For as long as there hasn't been an example of an orchestral or full film score working interactively in real time, it's hard for anybody to get what I'm talking about. In a way, once we get a flagship product out there that does all this stuff, every time someone goes back to scoring a game in the normal way, I hope they're going to say, "This is nowhere near as good as what Headspace did."

Aside from the technology itself, how will multimedia change how we think and feel about art?

Boy, I wish I could answer that. It's easy to talk about some of the peripheral things. From the audience's standpoint, the appeal of all this stuff is that instead of vicariously watching in the third person as a hero or heroine lives out your wonderful dreams, you can actually live them yourself. It's rather like that moment of lucid dreaming, where you realize that you're in control.

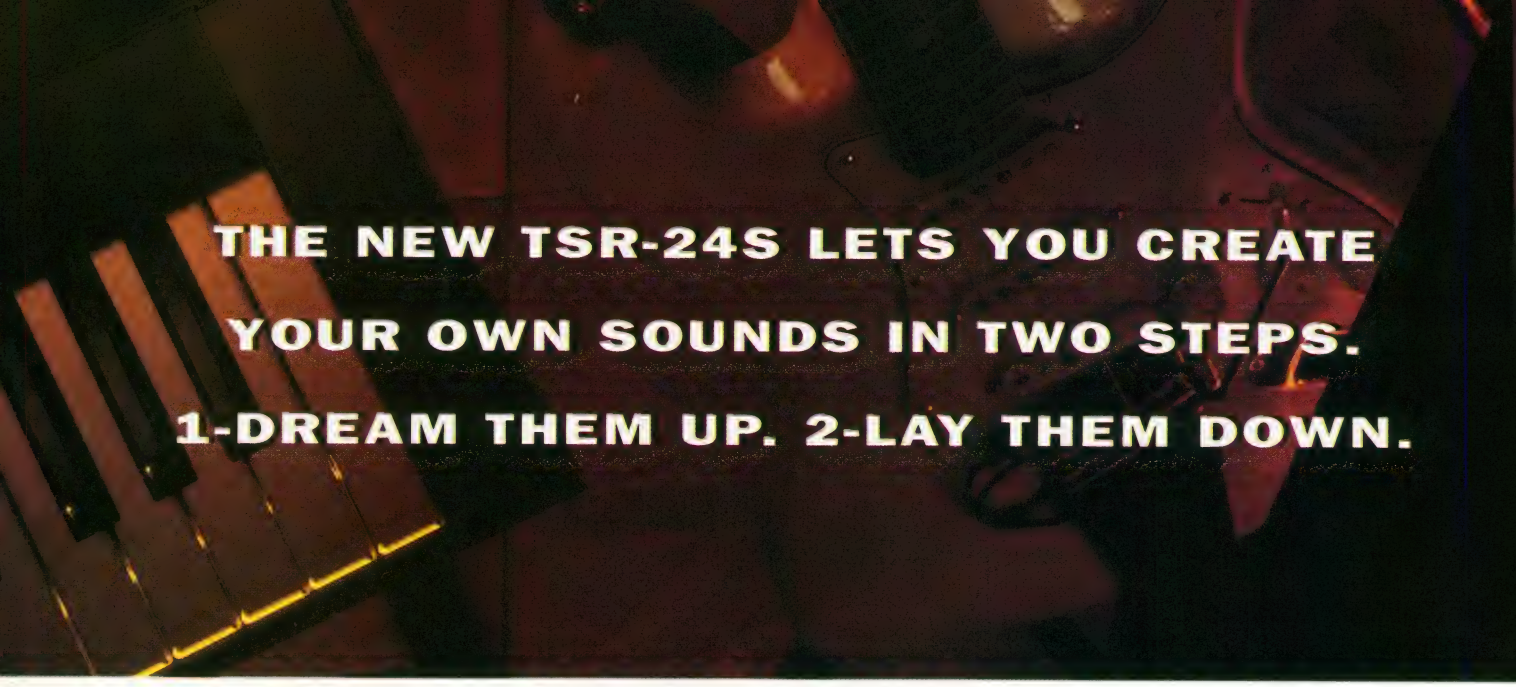
So you see more audience involvement.

There *has* to be more involvement. Otherwise, why would we put up with this little picture on our screen, or this sound that's not as good as what we hear on our hi-fi? It's nowhere near as immersive as going to a movie. Yet you go to a movie, and you're one of thousands of audience members who have paid their money, strapped themselves into their seats, and watched this same film. It doesn't demand any response from you, other than that you pay and you go. I often say that if I was a teenager today and I really wanted to be a rebel, the last thing I'd want to do would be to buy an electric guitar or a drum kit or a synthesizer, because that would immediately plug me into the same thing that my brother and probably my father was doing. It's all already been done in rock and roll. But if I get some of this software and a handicam and a modem, there's so much to explore, so many sacred cows to shoot down, because the world of film and TV is still very staid. Committees are setting all these standards. I know a couple of 16-year-olds on opposite sides of the Atlantic, who know nothing about each other but they dress the same, talk the same, and act the same. All they want to be is Kurt Cobain. The problem is that there hasn't been an outlet for those guys in TV production or, maybe, in film production.

Perhaps film production demands more life experience than music.

It has, but now not so much. Now, if you have a camera, a few friends who can act, a desktop editing system, and a modem, you can make a film. It's like when the Sex Pistols started: It was possible to make a lot of noise in a pub in West London and shock a nation, whereas when the Beatles and the Who were starting out, the only way to get an audience was through the Tin Pan Alley route. You had to form a band, rehearse it, get some London producer or A&R man to come up and see you, sign a deal. . . . That was the only way to get a record out. Then the indie thing happened, changes took place in radio, music video came along, and stuff like that got to the point where the Sex Pistols could be all over Britain although they hadn't made a record at that point.

The same thing is starting to happen with film and TV. Doom and Myst, to take a couple of game examples, both spread by word of mouth. Over a period of time, it developed to the point that the outlet was there for someone to achieve an incredible degree of notoreity and really be a rebel. The exciting place to be now is right there.



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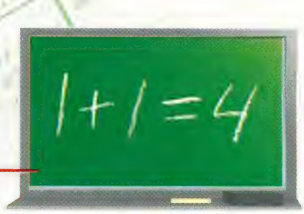

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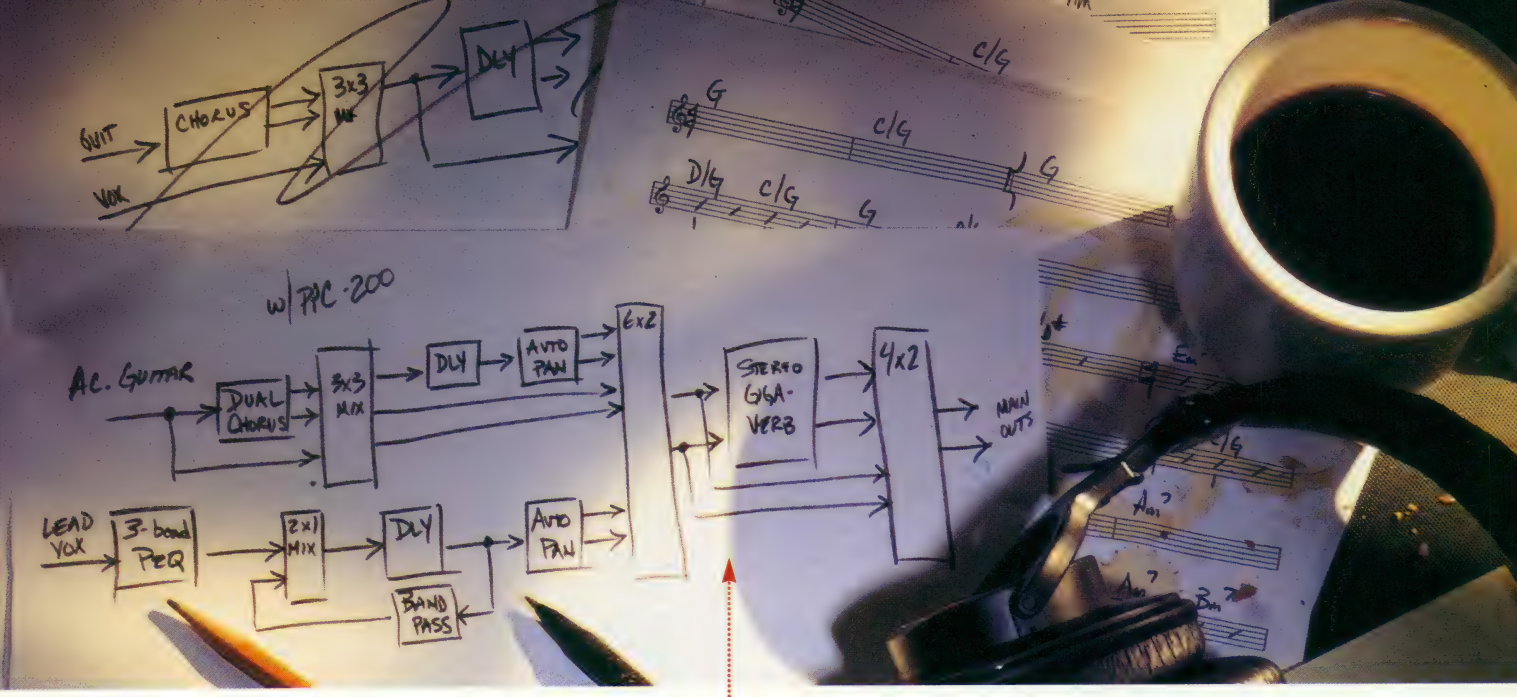

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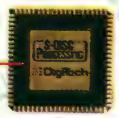

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Digital keyboard instruments: Where would we be without 'em? In spite of our resurfacing fondness for old analog instruments, most of us do most of our day-to-day musical work on one or more of the various computer-based types of keyboards available. To get to the roots of digital keyboard history, we have to go back to what might be considered a somewhat unlikely source. We have to go back before the Yamaha DX7, which made digital synthesis commonplace overnight in the mid-'80s; we have to go back before the GDS and Fairlight CMI started turning heads and pocketbooks in 1979. As a matter of fact, we have to go all the way back to 1971. Keep in mind that in 1971, Vox Continentals were still being manufactured, the Minimoog had only been out a year, Apple was the Beatles' record label, and midi was a skirt length. Yet in 1971, with relatively little fanfare, polyphonic, digital sample-playback instruments were being regularly used by a select group of keyboard players. Cerebral, university-sponsored experimental composers? Underground rock-jazz-folk-fusion pre-cyber punks? Nope, they were mostly church organists.

The Allen Organ Company of Macungie, Pennsylvania, was started in the late 1930s by Jerome Markowitz. While working on a design for a stable organ oscillator in 1936, Markowitz sought out one of the new electro-mechanical Hammond organs that were then becoming so popular. Finally tracking one down in a tavern in Queens, New York, he found the Hammond's sound to be quite pleasing. Markowitz decided, however, that he wanted his organ to more closely approximate the traditional pipe organ sound, thus setting the direction of the Allen Organ Company. The first Allen organs (which were also the first completely electronic organs) used Markowitz's vacuum tube oscillator as a sound source. In 1959, Allen started building transistorized instruments. These tube and solid-state organs became very popular with churches and other institutions that wanted pipe organ sounds but could not deal with the expense and maintenance hassles of a real pipe organ.

During the late '60s, Allen began working with North American Rockwell on creating digital musical instruments that used sample-playback technology. These organs were based on Rockwell's MOS/LSI (Metal-Oxide Semiconductor/Large-Scale Integrated circuit) devices, which had previously been used only by the military and NASA. At this time the Apollo space program was winding down, and evidently Rockwell was looking for commercial uses for this technology. The year 1971 saw the introduction of the world's first two digital consumer products: the Sharp hand calculator and the Allen Digital Computer Organ.

The concept behind these computerized organs was elegant and logical. Sets of the most desirable pipes from numerous pipe organs located as far away as England were brought to Pennsylvania to be sampled, or in some cases pipe organ builders were commissioned to create pipes specifically to be sampled. These would have been among the first digital recordings of musical instruments ever made. The resulting sampled sounds were then incorporated into the memory of the digital organ to be selected by a stop and played from the manuals or pedalboard in the same way a pipe voice would be.

Given the state of the art in the late '60s and early '70s, these were short samples with single-cycle loops. Clark Ferguson, Allen's advertising manager, remembers, "We performed Fourier Analysis on every sample, tweaking specific harmonics to get sounds that blended together well." Those of us used to editing sounds on a computer screen and hearing the results immediately may have trouble comprehending what the Allen engineers of those early days had to deal with. As Jerome Markowitz wrote in 1989, "The voicing procedure [in 1970] consisted of punching harmonic amplitude data onto an IBM card and running a computer program which converted the harmonic data into a corresponding waveshape. The waveshape data was then punched onto another IBM card which, when inserted into the card reader of the engineering model, allowed me to play the waveshape as a stop on an organ. . . . In those days it took a day to turn around one voice test." Similar data cards could be read directly by some of the Allen Computer Organs, giving the organist ►

vintage rmi

The World's First Digital Sample-Playback Synthesizers

BY **BARRY CARSON**

access to many pipe voices not available in the internal memory of his or her instrument.

These pipe organ sounds differed from those that are available for samplers nowadays because, rather than sampling the organ with all its stops pulled in its spacious and reverb-laden environment, the Allen engineers sampled each pipe independently in a special anechoic chamber. This gave the organist the ability to add or delete ranks of pipes as he or she wished, a performance technique as important to organ playing as the use of velocity is to piano playing. Since the pipes were sampled in an acoustically dead room, their sound would be completely dry; any reverberation would be added by the church or cathedral in which the Computer Organ was played (or by a signal processor). According to Allen's plant manager Tom Emerick, this early sample-playback technology appeared in a variety of organs, from the 100 system, which included one onboard computer, to the 1200 system, which included four separate computers and a lot of "bells and whistles." By the mid-'70s, custom Allen organs were available with as many as 12 onboard computers.

Clark Ferguson notes that pipe organ sounds were a perfect first choice to use the embryonic sampling technology on. "Each organ pipe is its own musical entity; you don't have the problem, like you do on a piano for example, with there being the sound of the resonant instrument body. This meant that we could transpose a sample quite a ways without getting the strange sorts of sounds you get when you transpose a piano sample. Of course pipe organs have some oddities of their own. A pipe organ will have its own split points across the keyboard as different pipes come into play that will be made of different alloys as demanded by the physical structure of the pipes themselves. The question came up, 'Do we include these imperfections or do we attempt to actually improve the sound of the instrument by not including them?'" It turns out that the limitations of the early technology precluded much multi-sampling. Today, however, Allen makes extensive use of multi-sampling, which allows them to incorporate all changes that occur in any sound over its range. "It's ironic," says Ferguson. "An organ builder in the 1800s would have loved to have a seamless sound from one end of the keyboard to the other, but the technology of the time prevented him from doing so. In the early '70s, the technology *forced* us into that kind of seamless sound. Now that we have more advanced technology, we can go back and add the kind of imperfections that the early organ builder was forced to live with. But that's what people expect to hear when they play a pipe organ."

The fairly constant sound of a single pipe also lent itself well to the single-cycle looping then available. Allen used other technology to introduce the minute pitch variations that show up in an acoustic pipe and grafted the chiff of the pipe attack onto the beginning of the sustained pipe sample — a technique that became popular as L/A synthesis in the mid-1980s.

While this early sampling was going on, the Rocky Mount Instruments division of Allen was using technology based on Allen's analog organs to produce a line of professional, portable keyboard instruments, most of which were built in Rocky Mount, North Carolina. The most popular of the RMI line was the Electra Piano, the production of which extended from 1967 into the mid-'70s, overlapping that of the first Keyboard Computer. (A closer look at the early RMI instruments can be found in the electric piano story in the Dec. '93 issue of *Keyboard*.)

Aren't those organ tabs colorful? Two years after introducing the KC-I, RMI released the KC-II.

The rarest digital RMI instrument, the Harmonic Synthesizer, a monophonic instrument that was manufactured in the mid-'70s. The layout of its sliders reminds us of another additive synthesis machine from the past, the Crumar GDS (see Vintage Synths, Jan. '94).

When Ferguson and Roger Powell were both working for ARP in the mid '70s, Ferguson — who had earlier worked for an Allen dealer — told Powell about these computerized organs. "We were thinking, 'Boy, it would be great if

Test-Driving the RMI KC-II

By Barry Carson

Back in the mid-'70s, I never had five grand to spend on a synthesizer, so I never got a Keyboard Computer. As a matter of fact, I never even saw one in person until recently. Researching this article, however, I came across one that was available and I spent a couple of weeks putting it through its paces. No information is available on the number of these instruments built, but it seems safe to assume they are pretty scarce. Since most keyboard players may never have the chance to actually play one of them, and since it certainly isn't your average vintage synth, I will give a quick review of my test drive.

Playing the KC takes a little getting used to. Organ tabs control almost all the features, pipe-organ-like couplers layer sounds from the different divisions, and new waveforms are entered using the old "do not fold or mutilate" computer cards. Interesting effects can be created by slowly inserting a card and listening to one sound transform into another. The pitch-bender, vibrato, and envelopes are all controlled by the feet. Pitch-bending with the right foot can be pretty effective, although my left hand would twitch on an imaginary wheel every time I bent a note. Adding modulation with a pedal is pretty useful; it was a popular option in the DX7 days. The KC envelope generators, on the other hand, are quite far removed from the good old ADSR and its descendents. Seven voice-type tabs, three foot switches, and one pedal control the shape of the envelopes. Different envelopes can work on different voices simultaneously, creating effects like having a harpsichord layered with sustaining flutes or having a bell attack fade into a sustained organ sound.

The sounds of the KC tend to fall into three categories: polyphonic synthesizer sounds that utilize traditional (albeit digital) sawtooth and pulse waves, as well as some sampled waveforms, ringing digital sounds like the ones that everyone used when the DX7 came out, and pipe organ sounds. It should be no surprise that a synthesizer made by a builder of classical organs could sound so much like a pipe organ; the surprise might be that such primitive sampling technology (16 sample points per sound) could yield such realistic sounds. I've played enough pipe organs to be amazed with the sound of this thing played in a digital-reverb-generated cathedral; you can almost smell the wood and incense (the church kind, not the hippie kind).

To those who like to use vintage electronic keyboards in real-life situations, the most significant fact may well be that, once I dusted the KC off and awoke it from its long slumber, it worked flawlessly. 'Nuff said!

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we could get the insides of one of these things into a portable case and use it onstage.'" In an interview published in the July 1980 *Keyboard*, Powell recalled this discussion: "Clark Ferguson . . . and I were sharing a house together when he got a call from RMI to help them develop this product [the Keyboard Computer]. He and I had already discussed making something very similar to it, and we had built a console that housed my keyboards, and we were wondering if we could get one of those big Allen computer organs into a smaller box. Literally about a month later, Clark got a call from Allen and they had already been thinking about making the product. I got one of the first ones that came off the line. . . . It had lighted pushbuttons on the front, and I helped them with some of the sounds here and there."

Ferguson continues, "Not long after my discussion with Roger, Jerome [Markowitz] called me and asked me to drop by. He had taken the insides of an Allen Digital Theatre Organ and put it in an RMI piano case; this was the prototype of the first RMI Keyboard Computer, the KC-I. He asked me if I wanted to work on it." Ferguson, who has been at Allen ever since, recalls that the built-in waveforms of the KC-I were originally samples of theater organ pipes. Traditional theatre organs used pipes that were more colorful-sounding (or more raucous, depending on your orientation) than those used in classical organs, but these sounds weren't all that useful in the musical settings in which the KC found itself. "People using the KC-I tended to spend most of the time using the card reader to access samples," says Ferguson. "What we did was find out which cards most people used a lot, and those sounds were built into the KC-II. The KC-I and KC-II have pretty much different sets of waveforms." The KC-II also had presets, a feature the KC-I didn't have. "This made it easier to use, since you could be playing a preset with one hand and programming with the other; you could then cancel the preset and your new sound would be there."

Introduced in June 1974, the KC-I would have to qualify as the first commercially available, performance-oriented, polyphonic digital synthesizer. At the time, RMI made a conscious decision not to refer to the Keyboard Computer as a synthesizer because to most people that term meant only a monophonic, analog instrument with VCOs and filters. The KC-I would also be one of the few synthesizers to be designed with three discrete outputs, and the only digital synthesizer in history whose ROM contained only theatre pipe organ samples. The first KC-Is were built in the early style, wooden RMI body and covered with a black Tolex-like material; later versions were built with the black plastic RMI body. The KC-I cost $4,495 and featured lighted pushbuttons that selected 29 theatre organ waveforms ranging from a floor-shaking 32' up to a shrill 1'. These sounds resided in three divisions — corresponding to the pedalboard and two manuals of the theatre organ — that could be layered in various ways and detuned. The sounds could be assigned to either or both of a set of stereo outputs. These outputs were controlled by a pair of pedals. The third audio output (controlled by a third pedal) was for a fuzz sound. This was not the traditional distortion-type fuzz, however. As Ferguson points out, "The fuzz output took information straight from the MOS ahead of the DAC. The pedal for this output was spring-loaded. It was a great effect for accents and the like, but you wouldn't want to play a whole song with it." A fourth pedal was used to control up or down pitch-bends. A card reader allowed access to any of the Allen sampled waveforms, and a set of rather complicated envelope generators, pitch-transposer, and vibrato rounded out the package.

The Keyboard Computer-II replaced the KC-I around 1976. It cost $4,755 and was in production until 1982. The KC-II looked sort of like an RMI electric piano on steroids. The instrument, which used the same black plastic body as the later versions of the piano, had a control panel with 55 colorful control tabs, a handful of knobs, and the optical card reader. The KC-II also included five footpedals, two footswitches, and a sustain/percussion pedal. The pedals controlled the envelope as well as volume, modulation, and pitch-bends. The third fuzz output

and its pedal were not included in the II. "We decided we really wanted to give players the ability to control the envelope shape and vibrato depth with pedals, so they could do so while playing with both hands," remembers Ferguson. "That brought us up to six pedals, not counting the footswitches and the sustain/percussion pedal; that was just too many pedals."

The newer instrument had stereo outputs; sounds from the three divisions could be assigned to either the right or left channel, or both. The lighted switches of the earlier instrument were replaced with the more traditional organ tabs because of reliability problems. "We bought those lighted switches from someone else and some of them began breaking," Ferguson recalls. "When we upgraded the instrument, we decided to use organ tabs we could make in-house, because we knew they would last forever. It was also nice because we could engrave them and they were a pretty good size. We could print a lot of information on those tabs when we needed to. In a way, using those organ tabs might have been a mistake, though: People would see the KC-II and say, 'Oh yeah, it's a portable organ.'"

Ferguson remembers other problems with having the first digital synthesizers: "People would ask about the filters, or how many oscillators it had; they really had no idea what was going on. We could have gone out of our way to mount a campaign to educate the public about digital synthesizers, but we elected not to. We chose not to make a big deal out of it." Interestingly, the KC-II catalogue does contain

RMI didn't label its first Keyboard Computer, the KC-I, as a synthesizer, because they didn't want the buying public to think it was only monophonic. Note the card reader slot to the right on the KC-I's instrument panel.

a quick tutorial on polyphonic voice assignment. Ferguson explains, "Back then every other instrument was like an electronic organ on which every key would play if you held them all down, or like a synthesizer that would only play one note. The KC had 12 voices, but you could do a lot of layering and that would cut the polyphony down. Everybody knows about that now, but in the mid-'70s it was new territory." George Watson, a Rockwell engineer during the late '60s, was the man who first conceived of polyphonic note assignment. Giving the digital Allen Organs 12 voices was based on the fact that, since the densest organ music could contain only 12 notes at any one point in time (ten fingers and two feet), 12-note polyphony would preclude voice stealing. Actually, voice stealing as such does not occur on the KC: If all 12 voices are in use, any new notes played will not sound until one of the sounding notes' envelopes comes to an end; when that voice is free, the new note will sound.

With its ability to play back recordings of acoustic instrument waveforms, the Keyboard Computer invited comparison with the popular '70s 'analog sample-playback' keyboard, the Mellotron (see Vintage Synths, May '91), which also resided in the pricey four-grand neighborhood. "I did have chances to go head-to-head with the Mellotron," remembers Ferguson. "The KC-II had a great string sound; it could blow the Mellotron away. Keep in mind that the Mellotron really didn't sound like strings, and it had only three sounds onboard. Changing them meant replacing the tapes. The KC-II had dozens of waveforms onboard, and accessing new ones was as easy as inserting a card." Another Mellotron competitor, the Vako Orchestron, also made accessing new waveforms easy, but while the translucent, phonograph-record-sized Orchestron waveform disks cost over $100 each, a KC data card could be had for around three bucks. "The KC-II was also just about indestructible," Ferguson continues. "The Mellotron

wasn't. The footpedals on the KC-II gave you a lot of control that was missing on the Mellotron. You could change the envelope shape, add vibrato, or do pitch-bends while you were playing with both hands, things that couldn't be done on a Mellotron. We also had string pizzicato that could be activated with a footswitch. We were the only keyboard back then that gave that option."

What samples created that famous KC-II string sound? "Well," admits Ferguson, "it used digital sawtooth waves. We tried all kinds of samples, but the sawtooth sounded best because we had stereo layers that we detuned a little, that and the early digital envelope generator. Back then the samples and the envelope generator weren't really that great. We used the same basic digital envelope generator that was on the organs; it was perfect for organ sounds, but if you stretched it out you got this digital ramping noise. This envelope noise was great, though: It made the instrument breathe. It added something that wasn't there. On the strings it sounded like bowing noise, which was wonderful. It was very serendipitous. These primitive waveforms and primitive envelopes really complemented each other. People used to think we actually sampled the bowing noise and stored it in the instrument's memory, but it was just the envelope. Those envelopes also had rate scaling; a note low on the keyboard could have longer attack and release times than a note played high on the keyboard. This added a lot to the realism of the instrument."

While strings, bells, Hammond B-3, Clavinet, flute, and a host of other sounds could be approximated (some pretty closely), it is the KC-II's pipe organ sounds that shine with a realism that is downright eerie 20 years later. "Even though the sampling technology was pretty primitive back then," Ferguson relates, "Allen did some incredible processing of those samples to get its pipe organ sounds. That's where the pipe organ sounds in the KC-II came from." Although the Keyboard Computers never became as popular as the earlier RMI Electra Piano (maybe because they cost five times as much), they were used by a number of influential artists: Powell — who described the instrument's sound as "punchy, gutty, and clean" — used one extensively, along with fellow Utopia member Todd Rungren. Stevie Wonder, Rick Wakeman, Isaac Hayes, Ray Charles, Michael Pinder, and Jean-Michel Jarre, among others, also used one or both of the KCs.

Of the digital RMI instruments, the rarest would be the RMI Harmonic Synthesizer. Built from around 1974 to 1977 and costing $2,995, the Harmonic Synthesizer combined digital additive synthesis with analog filters and envelopes. Built into the familiar black RMI case, this was a two-oscillator, monophonic instrument with a 49-note keyboard that could be transposed over four octaves. Each oscillator used digital circuitry to create 16 sine-wave harmonics that could be individually adjusted. Each oscillator also had its own envelope and could be modulated and pitch-bent separately. The output could then be sent through lowpass, bandpass, and highpass resonant filters. Presets that included clarinet, pulse, flute, horn, and reed were available for each oscillator and overrode the programmable controls. The Harmonic Synthesizer also featured an arpeggiator (referred to as a sequencer), separate portamento for each oscillator, and stereo outputs (one for each oscillator). Quite a few of these instruments ended up in university music departments, where many are still in use. Unlike the sample-playback Keyboard Computers, the additive technology used in the Harmonic Synthesizer never found its way directly into the Allen Organ line. However, Emerick points out that the instrument had an indirect effect in that building it was "a great learning experience." Although it was never made in large numbers, the Harmonic Synthesizer showed up in the keyboard arsenals of a number of important performers, including Stevie Wonder and Ray Charles. It can also be heard on Jean-Michel Jarre's *Oxygene*.

Although, like the Mellotron, the KC could produce all kinds of sounds, it is (like the Mellotron) remembered primarily for its sustaining sounds, such as strings and organ. (Anyone remember the Mellotron vibes?) According to Emerick, the DK-20, which was the last instrument to come out under the RMI name, was built to create more percussive, electric piano sounds.

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"We were thinking of it as a kind of replacement for the Electra Piano," he recalls, "but it actually became more than that." As a matter of fact, the electric piano sound of the DK-20 has a ringing, digital brightness that foreshadows the ubiquitous digital electric pianos made popular by the DX7 and its relatives. The DK-20, which came out in the late '70s and cost $2,495, actually had four EPROMs, each containing a sampled sound that was less bright and had a longer envelope than the preceding one. "When you hit a key, all four waveforms would sound," Ferguson explains. "The very bright tine sound would quickly die away, then the next brighter sound would die away, leaving a more mellow sound that would fade into the softest waveform." Along with electric piano sounds, a stock DK-20 featured lute, Clavinet, guitar, and jaw harp sounds. The DK-20 user also had access to an RMI library of alternative sounds stored on EPROMs; a few third-party developers also came out with EPROMs for this instrument. The DK-20 featured a programmable envelope generator and a complex phase-shifting algorithm that worked on a note-by-note basis as a function of envelope speed and shape. The DK-20 was produced up until around 1984, the year that saw the beginnings of a flood of inexpensive samplers and sample-playback synthesizers, all of which carried forward the technological concepts pioneered by Allen a decade before.

As with the entire Allen Organ line, spare electrical parts are available for the Keyboard Computers. The computer cards that contain sample data for Keyboard Computers are also still available and completely interchangeable with cards for the early computerized Allen organs.

So what ever happened to RMI? The Allen Organ Company lives and thrives, building church instruments that incorporate a whole new generation (the eighth since 1971, Emerick estimates) of digital technology. These newest classical organs feature state-of-the-art 16-bit sample playback, as well as MIDI for those organists who wish to record their performances — including pedal and stop movements — into a sequencer, or control synthesizers or other sound sources from the organ manuals. The Allen product line also now includes MIDI expander modules and sequencers, as well as sequencer disks of classical organ music. While, as Ferguson puts it, "the RMI philosophy lives on in these MIDI products," the early '80s brought an end to the RMI line of instruments. "We made a conscious decision," Emerick remembers. "We could see a flood of inexpensive digital keyboards on the way. We were never geared for making millions of instruments. Our main focus had always been church organs; everything else we ever did was strictly a sideline." Is Allen ever tempted to revive the RMI line and get back into professional stage or studio instruments? "We tend to be a quiet company," Emerick muses. "Those RMI years were great fun and very exciting, but we have a niche for ourselves in the church organ business and we do very well at it."

One of Allen's new instruments for the classical market is the Continuo-Plus, a semi-portable MIDI instrument that features a 61-note keyboard and harp, celesta, and classical guitar samples, as well as those of a small pipe organ and harpsichord. Although its handsome walnut case doesn't really resemble any RMI instrument, looking at it I get a feeling that is similar to meeting an old friend from the late '60s who has started dressing better, hanging around with better company, and has developed a more refined taste in music. The RMI products may be gone, but it's nice to know the Allen Organ Company is still there, doing what it does best. ■

The author would like to thank Tom Emerick and Clark Ferguson of the Allen Organ Company for all of the information they were willing to share and the time they were willing to invest in researching this article. Other information was gleaned from Jerome Markowitz's 1989 book, Triumphs & Trials of an Organ Builder, *available from the Vox Humana Press, Macungie, PA 18062.*

Barry Carson has taught English literature, education, and electronic music. He has written fiction, composed music for drama and film, and is a certified counselor. Contrary to popular belief, he does enjoy occasionally playing keyboard instruments built in the '90s.

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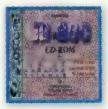

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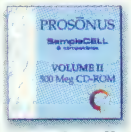

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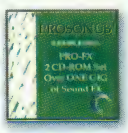

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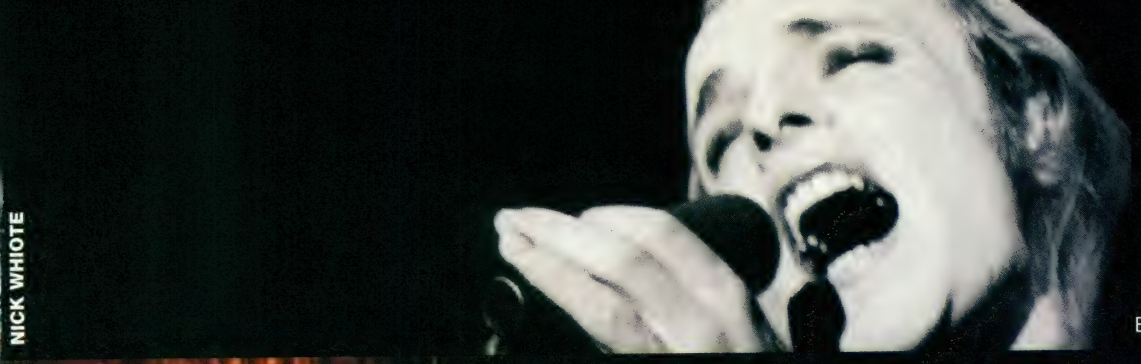


NICK WHIOTE

BY **ROBERT L. DOERSCHUK**

e brian

Style — the agglomerate effect of notes, stacked and strung in a line amidst points of stress and rest — is what the great players teach. From Jelly Roll Morton through Keith Emerson, we learned to define *style*: This run, that lick, these voicings, add up to one musical personality. Our perceptions of Tatum, Evans, and Wakeman are based on how they assemble their notes. This requires taking the long view, and by example teaches us that we should assess our own work from a similar perspective.

It's like going to an art museum, where ropes define the appropriate distance between a painting and the viewer. The space between, patrolled by security, is a no-man's land, in which the broad view is harder to discern. Seen up close, a Seurat scene disintegrates into a blizzard of dots, while a Turner seascape explodes into furious collisions of color. Better, perhaps, to stand back and take in the finished work, undistracted by its details.

Brian Eno doesn't seem to have bought that argument. Maybe that's why, as an art student, he insisted on exhibiting his paintings at one show beneath the waters of a bubbling stream. With "style" deliberately obscured, viewers had to reorient themselves: The paintings themselves became details within a broader landscape.

In music, too, Eno forces his public to think differently. Whether building sound collages or suspending isolated notes in a vacuum, he breaks music down to molecules ►

of sound; freed from duty as an element in a particular run or chord, each musical microbe takes on a life of its own. In one sense, his classic *Music for Airports* adheres to conservative principles: Themes are easy to recognize. Dissonances resolve. There's even a rhythmic structure. But it's all slowed down to the point that one can only appreciate these details through a kind of contemplative immersion.

Put it this way: Most music is like a shower: bracing, busy, dynamic, full of turns and adjustments. Eno offers, instead, a bath: timeless, still. Where the shower stimulates through sting and spray, the bath treats sensation as a singular thing — in effect, a single drop of water, magnified and motionless.

By changing how people listen, Eno challenged all musicians to reconsider the way they play. Modern sampling practices, for example, owe much to his 1980 collaboration with David Byrne, *My Life in the Bush of Ghosts*, in which Lebanese folk songs, talk radio babble, and gut-busting sermons jostle over hypnotic dance beats; original contexts are erased, leaving only traces of emotion as colors on Eno's palette. Further back, in 1977, his collaborations with Cluster (*Cluster and Eno*) and David Bowie (*Low*) predated ambient house and techno-pop, respectively, by several lifetimes, as measured on the *Billboard* charts.

Yet Eno's greatest contribution is to have exposed the beauty of single notes and the power of silence. The stillness induced by *Discreet Music* anticipated the effects of new age but, more significantly, suggested that the basic substance of music, sound itself, carries as much expressive potential as the flashiest solo or the funkiest turnaround.

Born Brian Peter George St. John le Baptiste de la Salle Eno in 1948, he emerged from religious studies and art school with rudimentary musical skills and a mind locked into a peculiar mode of contemplation and curiosity. His travels led him through a stint as co-founding member of Roxy Music into a disenchantment with rock by the mid-'70s. At that time, he and artist Peter Schmidt published *Oblique Strategies*, a set of "oracle cards," each bearing an obscure admonition for those who read it to consider or ignore. In dozens of subsequent projects, including video sculptures and paintings, airport installations, and gallery shows, Eno gently prodded the pop mainstream toward a postmodern aesthetic.

There's plenty on Eno's plate in '95, including two albums with David Bowie, one more with U2, and a lecture series as visiting professor of communication design at the Royal College of Art. But it was (appropriately) a misty, drizzly, and reflective afternoon when we contacted him and asked for his views on the state of the keyboard art.

Twenty years ago, Keyboard *was writing about pianos, organs, electric pianos, and a handful of primitive synths. How do you assess the explosion in music technology that we've seen since then?*

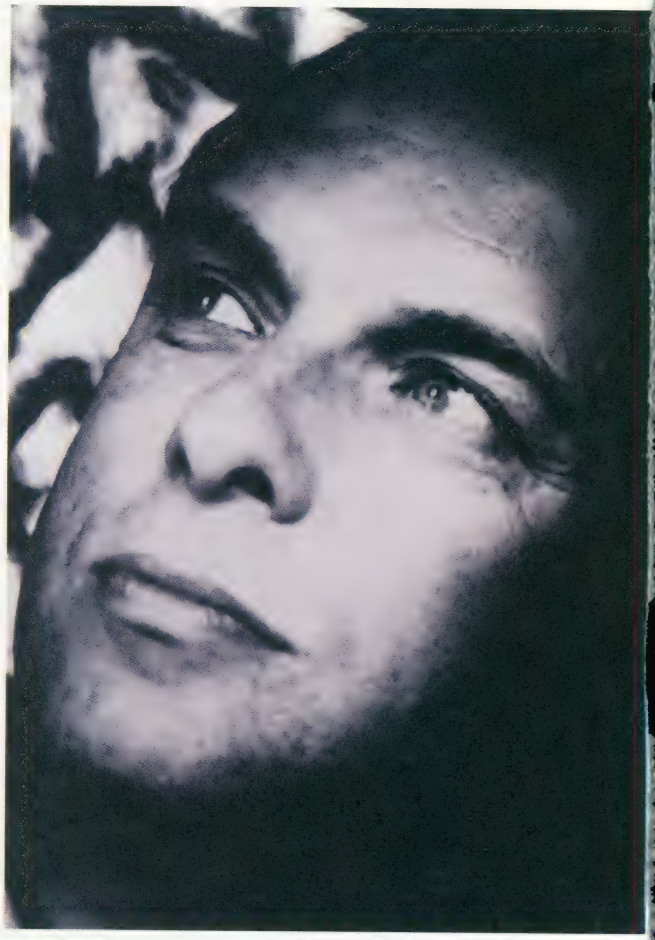
As with all technological changes, the ones we've seen in music technology obey the most obvious momentum. I always criticize synthesizer manufacturers for making the most obvious technological choices, which are simply to multiply the number of options they put in the machine. If you're printing chips, the easiest thing is to make a few more options. The hardest thing is to try and solve the problem of making these machines interface better, or relate to human beings in new and interesting ways. How do we make them, for instance, anything like as responsive as some of the acoustic instruments, which, after all, are highly evolved? I would like to see two things. One is a type of synthesizer that doesn't offer huge numbers of options in terms of stored or possible available sounds but does offer tremendous response to you as a player, so that you can actually start to feel what it's like to play this instrument.

The acoustic instruments were based on the model of being as responsive as possible to human control. In electronic music, real-time control has become only one of several priorities.

And that's a shame, because that gives rise to a certain kind of music. It's very hard to imagine Jimi Hendrix playing his type of music on a synthesizer. It's easy to copy him on a synthesizer, but it's hard to imagine coming up with playing like his on such a non-physical instrument as most synthesizers are. Synthesizers have fulfilled their promise in the sense that they've made it possible for the player to have anything on the menu. But they're completely underevolved in the other direction. They're not much more sophisticated in terms of the rapport you have with them than they were 20 years ago. Young people often talk about the options on each synthesizer, and I always say, "Look, options are not important. Rapport is important. If you're the kind of person who doesn't want to sit and read manuals forever, just get something that feels nice to play. You'll do fine with it, even if it doesn't have very many options." I mean, if options were the only important thing, then quite a lot of instruments would have been out the window a long time ago. The flute doesn't offer you a lot of options. The drums offer you very few. From the synthesizer perspective, the idea of a bloke spending his life bashing bits of wood is absurd.

How would you propose to deal with the synthesizer's limited playability?

I've been developing an idea for a programming style that I call "evolutionary." Let's say the synthesizer offers you 32 sounds when you switch it on. You listen to those quickly and say, "Right, number 14 is quite close to what I want, and number 18 is sort of close as well." You press those two, and the synthesizer gives you 32 mutations of those parent sounds. Then you go, "New number 15 is pretty good. Let's hear some mutations of that." As you close in on something you like, you can reduce the rate of mutation. What's interesting about this is that you don't need to have any idea at all what the synthesizer is doing, although it can be as internally complex as you can imagine.



Even in the analog era, when synthesizers offered greater control over nuance than many current models, many erstwhile pianists were intimidated by the simplest programming gestures. Your scheme takes the idea of user control over sound and separates it from the need for technological understanding.

That's the idea. The only thing the player needs to exercise is judgment. They don't need to be able to exercise skill. If you worked like that for a while, you'd end up with a library of sounds that you had discovered by that process. After a couple of weeks, you would have a synthesizer that's entirely unique to you, with your special sounds.

Of course, in the end, someone would just store your best sounds on disk and sell them

as third-party samples.

Well, you're quite right. But it would also be easy to plug in your third-party samples and say, "I wonder what variations of that one would be?" If you only hit a button to get those variations, those third-party samples would be just like my [Yamaha] DX7 sounds. I never really use the same sound twice, but I'll tweak the ones I've stored a bit.

It also makes the production of sound more organic in that it would be more mysterious. The player surrenders the traditional assumption in electronic music of having or striving toward complete control in programming sounds.

Of course, the very interesting instruments are not that controllable. I remember as a child just sitting at the piano and hitting the same note over and over again. It sounded sufficiently different each time for it to be interesting. If designers were allowed to deal with programs of sufficient complexity, it would be easy to encase that sort of thing in synthesizers.

You mentioned that modern synthesizer design has two drawbacks. What is the second one?

The second one is that they've remained linked to keyboards. I feel that particularly because my first synthesizer had such a crappy keyboard that I never bothered to use it, except for effects.

Which instrument was that?

The EMS. I wasn't a keyboard player anyway, but that gave me an edge because, certainly in England, I was the first synthesizer player to use the thing as something other than a keyboard instrument. Until then, people used it as a kind of organ with a few funny sounds on it. I couldn't use it that way, even had I been technically able to, so I started doing something else with it.

Do you think that stronger chops might have actually been a barrier to your musical development?

Certainly. I used to build up harmonies not by playing chords, because I didn't know any, but by playing each line at a time. So if I wanted what would be a harmonized chord sequence for anybody else, I would play one line, then I would play another line that went over it, and then I'd play another one. I'd find my way through, almost note by note. If you go through step by step, just following your nose, you will make quite different decisions because you wouldn't be subject to purely muscular habits that say, "My fingers should be this far apart if I want to follow this chord with that chord."

If you were a teacher, with a very well-trained pianist as your student, how would you help him or her get past that barrier of habit?

Studios offer a big way past that. If you start thinking of music as something you don't have to do in real time but something that can be built up, like a painting, that gives you a different way of working. You can think about it on, shall we say, the atomic level. The other level you can think at, through working with the kinds of processing equipment that studios have, is as a way of making atmospheres, landscapes, whatever you like. Nearly all the processing equipment you find in a studio gives you a way of changing the sense of space that the music is happening in. Now, this option doesn't really exist in classical music. We're familiar with the idea of using space as an element of composition, but most classically trained musicians have no conception of that.

For example, I have a young friend who plays violin and viola, a very good player. She started coming around to my studio because she was fascinated by what I was doing. I took it upon myself to try to help her escape her training [*laughs*]; that's what it amounted to. I evolved quite a few exercises for her. Some of them were purely to do with listening in a different way. For instance, I discovered that like most classical players, she couldn't play pushed time at all.

Pushed time?

You know, the kind of time that's built into any funk or soul record, where you're feeling 3/4 as well as 4/4. All music that comes from Africa has that feeling, which is why I often define classical music as music without Africa. So I gave her a Neville Brothers record and I said, "Why don't you try to learn the bass part on this record and play it on your viola?" She did, and it was the biggest thrill to her. I opened her life musically.

So many vital musical trends, from techno-pop to ambient, were on your agenda years before other artists picked up on them. What put you ahead of the parade?

Well, because of coming into music from a visual arts background, it wasn't possible for me to make music like other people did. So I would sit and fiddle with things, and listen to what happened. That's probably the first distinction: I actually listened to things, not to what I thought they were supposed to do but to what they actually were doing. Most people picked up synthesizers expecting them to do something they'd heard before. When they did do something they heard before, they were happy with that. But I thought the synthesizer was a fascinating instrument that could do entirely new things. When it did, I was pleased and would pursue them. Similarly, when I first started recording, the idea was that the studio was a kind of transmitter of pre-written songs. You'd go in there and get them on tape, with a bit of confectionary from the producer. But as soon

EBET ROBERTS

JEFFREY MAYER/RAINBOW

Opposite page: Eno today. Above left: Eno with Minimoog and EMS AKS, 1981. Center: Onstage with Roxy Music in the early '70s. Top right: Robert Fripp, Eno, David Bowie, c. 1980.

as I sat in the studio and started listening, I thought, "My God, this is music like I've never heard before!"

I'm having the same experience now. I work a lot with this graphics program called [Adobe] Photoshop. If you read any of the graphic art publications, they all say, "Look what I did with Photoshop," and they'll show you a picture of a daffodil with a little drop of water on it. "Completely computer-generated! Wow, wow, wow!" And I'm thinking, "What the fuck is the point?" Honestly, within 20 minutes of working with Photoshop, I was doing things I'd never seen before and thinking, "These are fantastic! Why isn't everybody else doing this?" But people are still busy making daffodils.

There's a parallel with electronic music technology and how it's used. Do you see a growing gap between the sophistication of instrument design and the level at which that technology is used?

People are doing much more of what you alluded to earlier, which is to use third-party samples. This is partly because the machines are getting more complex. The rate of change is getting faster as well; new generations of things keep coming out. I think people are finally saying, "I can't be bothered to learn this. It's going to be redundant soon anyway."

The people who make a difference are the ones who get bored. Now, I get bored extremely quickly. I get nauseated if I'm doing the same thing over and over again. It actually makes me feel physically sick; I'm not being metaphorical. I then stop whatever I'm doing and go on to something else, or I think, "I've got to find some way of upsetting the pattern." Of course, there are lots of people whose greatest pleasure is to do the same thing over and over. Perhaps they do have a real use in the world.

But rather than advise musicians to overcome certain limitations through that kind of repeated practice, you would suggest that they use their limitations to do something else with the ideas they've got.

Well, finessing is worth doing too. You might think of it as a two-stage process: Some people invent new words, but other people learn how to speak well with them. The people who exercise the vocabulary are doing something very important. I'm just not one of those. My fun is in thinking up other words to fit the vocabulary. It's like being a collage artist: You take this postcard, which somebody else made, and you stick it next to that photograph, which somebody else made. Then you put a bit of paint over the two of them and join them together. This is very in tune with what has been going on in painting for the past 15 years or so, with people sticking together not just the abstract qualities of sounds but the references that carry with them. All the engineers working with rap bands are having a terrible time because the artists insist on leaving all the scratches on the records they sample. What they're saying is, "Hey, this *is* taken from somewhere else, from another time and place." So part of the message of the music becomes the fact. It's collage, binding together history as well as sound.

It also creates an impression you described in one interview as "cultural ambiguity." What in our world makes this postmodern approach more interesting than the traditional exercise of digging deeply into one's own native culture?

I wouldn't say that it is necessarily more interesting. Equally interesting is the fact that some people, like Ry Cooder or perhaps Neil Young, keep digging in the same little trench, as it were, and coming up with neat stuff. What's changed is that the overall dynamic of where you search and what you look for has widened. It is possible now for there to be music stars who, in terms of the range of their work, are something like Samuel Beckett: They stay in the same place their whole lives and get better and better at what they're doing. Or it's possible to be an eclectic gadfly. Neither of these choices was possible 20 years ago. You were expected to have a boringly predictable rate of change in your career, to vaguely embrace new ideas as they came out but not to lose your identity, as they say in marketing. So the possibilities of range have changed: You can be very focused, you can be in the middle, or you can be vague.

You once suggested that ambient music is about "getting rid of nervousness." Did you begin doing ambient music in part because the world needed this music?

Yes. In the '70s, a few friends and I used to compile tapes for each other. We did this because we were dissatisfied with the way records were laid out: fast song, slow song, dance song, ballad, this pathetic concept of variety, which was based on the idea that your attention span for any particular mood could only be counted on for three and a half minutes, and after that something else had to be thrown at you to keep you listening. My friend Peter Schmidt and I used to put together long, long tapes that were extremely similar in mood. We would do a two-hour tape that changed mood

Brian Eno

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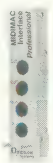

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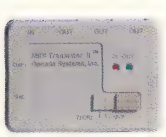

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only in the most subtle way. I remember he did one for me that was the slow movements of all the Haydn string quartets. He arranged it so that the key changes were very nice, from one slow movement to the next. So we were putting on music to create an atmosphere, a mood, in a place. We wanted that mood; we didn't want a different mood every three or four minutes. It's like arranging lighting so that there are dark parts of a room and light parts, so there's a consistency. You don't want the lights to flash bright every ten minutes and then suddenly go completely black.

Did your ambient experiments also function as a kind of personal therapy?

Really, it did. I described it on the back of *Discreet Music*, and I still remember it so clearly. I had had an accident, and I was confined to bed. A friend of mine came to visit me, and as she left I said, "Can you put a record on for me?" She put it on, but it was much too quiet — plus, one side of my hi-fi had broken down. At first I was listening and thinking, "Oh, shit, I can't hear the music." But then I realized I wasn't just listening to the music: I was listening to the rain, and to these occasional pieces of sound drifting above the level of the rain. I thought, "Now, this is interesting, the idea that music shouldn't exclude but should include, that the music you make can be a background against which other sounds can perform." This also related a lot to going out to restaurants or over to someone's house for dinner. They'd put a record on, and I'd think, "Why do they do this? You can't talk while this is on." You see, most music constantly vies for your attention.

Melodies sweep you along through verses to a chorus, and on through other episodes to the conclusion. Your ambient music is more static, yet it moves as nature seems to move, without apparent direction.

That's right. Most music has a very strong sense of narrative. It's teleological, as art historians say. Therefore, it has a strong sense of time being cut up into sections. That's exactly what you don't want if you're trying to dream. You don't want to be constantly brought back to a world that's cut up into little chunks. Most pop music does that. It's very exciting if you're dancing; it's not so nice when you're having a massage.

Oddly enough, much of the up-tempo music that comes out of the rave culture functions similarly to your ambient works. There's more emphatic rhythm, but it flows by. You lose track of where the eight-bar phrases fall. You might think of it as frenzied ambience.

That's quite true. I used to say that the closest thing to ambient music was heavy metal. If you've ever been to a heavy metal concert, everything becomes irrelevant except this blast of sound. It's an amazing experience to see a good heavy metal band. You're experiencing pure, physical sound. This is what's happening in clubs. The beat has gone down a bit in the past few months, but they reached a peak here last year when it was up to 150 or 160 bpm, sometimes even faster. When a beat is that fast, it almost stops being a rhythm and just washes over you, like pure sound. So you're right, it's an ambient experience for people with a lot of energy.

Over the years, as your options for sound sources have expanded, do you find that your vision of what's appropriate for your music has expanded, or has it gone deeper within an unyieldingly narrow range?

By nature, I'm an option limiter. I notice this in nearly everything I do. I prefer to start off by saying, "All right, let's not use any of these things. Let's see what we can do with these two that are left." Even when I'm producing, I do that with bands. In fact, my main value to people is to cut out a lot of possibilities and say, "Now let's focus on what's left." I've always done that with sound. My taste for sounds does exist within a certain band. I'm not interested in completely familiar sounds, but I'm not interested in completely weird ones either. When I started playing synthesizers, those were the two areas where people mostly worked. It was either something that sounded like an organ or something that sounded like a spaceship. What interested me were things that you sort of recognized, things that could seduce you, but which had sort of a detachment from anything you'd heard before. I still do that.

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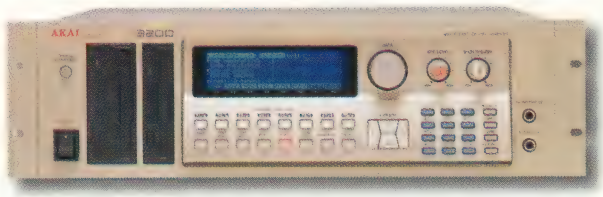

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possible universe of sounds has shifted as time has gone on. Some things that were unfamiliar have become familiar, so I've moved away from those a little bit. And things that I thought at the time were very familiar, and therefore not interesting, have so fallen out of use that they've started to sound interesting again, like acoustic piano. That, to me, sounds much more interesting than it did 20 years ago, because it's become rather exotic as a listening experience.

Still, the kinds of sounds you were making with, say, Cluster in the early '70s are very similar in character and function to the sounds you used on Neroli, *even with changes in equipment.*

Well, a lot of that comes from the question of why you're doing music. I went into music with perhaps a wrongly inflated view of what I should be doing. Coming out of art school, I said, "I'm supposed to be an artist. That's what I do. I'm not just going to piss around. I want to think things out, come up with new ideas, and find exciting ways of doing things. I don't just want to do what's expected of me." One of the strengths of English music has been that strange art school background that keeps pushing people into music who have this idea that their job is to somehow break new territory, and that they're failing if they don't.

What changes do you see enhancing the experience of listening to music in the future?

Well, first of all, audiences are probably sick to death with music. I know I am. I don't listen to music very much. I'm sitting here, at a desk, and next to me I have three or four hundred CDs on a shelf. I only bought about six of those; all the rest have been given to me. It's just so much stuff! How do you navigate through all this? What is it that catches your attention? This is why I think there's going to be a role for curators.

What sort of curators?

I can imagine somebody putting together collections of music that he likes and selling them. You say, "Oh, that's a nice collection. I'll buy his next one as well." This person creams off a little percentage on top, having put these things together. Sooner or later we're going to be delivering music down phone lines, and there are going to be people, something like DJs are now, who package it for you. These curators are essentially two things: They're filters who save you from having to listen to everything, but they're also connectors in that they make taste connections that you might not have made yourself. Eventually computers will be able to start doing this too. If you say to a computer, "I like Teardrop Explodes, Velvet Underground, Abba, Silver Apples, and Sinead O'Connor," I can imagine a well-programmed database saying, "In that case, have you heard Elastic Pure Joy? You might like them." It would scan the groups of things that people like and spot certain regularities of connection, like the fact that people who mention Tony Bennett generally didn't mention the Velvet Underground.

You could also do percentages, suggesting that you like Tony Bennett about two-thirds as much as you like the Velvet Underground.

It would help to specify particular songs as well. It would probably end up working a bit like the evolutionary synthesizer. Imagine you don't know anything about music. You walk into a record shop, and here are 32 buttons. You press one, a bit of music comes out, and you say, "I don't like that." Press another: "That's more like it." Press another: "Oh, yeah! That's quite good. Show me a lot of other things that are like that." Somehow or another, you might be able to navigate into rather interesting and remote areas of music.

Eventually, you might even be able to morph your own hybrid artist.

Exactly! It doesn't seem too far off.

In an interview with an eastern European magazine in 1980, you mentioned that "music in the '80s will be more boring, and I look forward to that." More recently, you predicted that '90s music would be more "messy, vague, more mixed up. It will move away from the naïve dreaminess of ambient/Velvets revivalism and from the clock-rigid robot dancing of techno/hip-hop/rave. It will be more wild, more complex, more organic."

God, how right I was [*laughs*]!

Where do you see the modern keyboard player in this context? How will he or she take part in, respond to, or even lead these trends, especially since some of it involves moving

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away from music that was produced primarily with keyboards?

My prediction is that improvisation is going to become a much bigger aspect of how people work. That's to say, I think people are going to spend less of their time doing carefully calculated, block-by-block studio work of the kind I was talking about before. That way of working is a little bit tired now. What will happen is that you'll find a lot more improvisers. I don't think they're going to be improvisers like you've seen in the past. They're going to be technologically very sophisticated, so there will be people sitting there with their sequencers and their samplers, and they'll be working live with that. Some people have started doing this — I have [*laughs*], and a few others.

I can also see a movement toward a different taste for recordings. One of the things about improvisation is that you get results that are messy and organic. You get results that sound like they were not tailor-made to fit onto a CD. I have this motto: "Make the medium fail." By that I mean, do something that sounds like it's bigger than something that can be fitted onto a CD. Suppose all painters knew that their work was only going to be seen on 11"-by-8" sheets of paper, printed in pretty much the same color ink. This would change a lot about the way painters work. You wouldn't get people like Frank Stella doing huge, three-dimensional pieces of painted aluminum; he'd just do a little picture that would look good on a nice little piece of paper.

My feeling about records lately is that so often I hear something that sounds like it was designed to fit on a CD. It neatly fits inside the medium. And I think, "How boring. What I want is something that seems to have all sorts of bits that haven't fit inside, so I have to try to guess what they are." You hear this a lot in jazz recordings, particularly the live ones, where you can't really identify completely what's going on. But that immediately engages your creative attention, because you start to make things up in your mind to fill the gaps. I want that to happen, and improvisation is one of the ways to do that. Improvisation announces to the listener, "This is happening for real, and we don't know where it's going."

The problem is that the next time someone plays that CD, it will be exactly the same as the first time.

Yes, but there might be a solution to that, although not in the near future.

A self-destroying CD that burns after one play?

Maybe one that just keeps mutating [*laughs*]. Though what you say is true, you can listen to an improvisation again and again, and still feel the excitement of the search going on. You can hear it when people are lost, and you can hear the thrill when they find themselves again.

But for keyboard players there's no particular challenge unique to the fact that they are keyboard players?

Well, keyboard players have a bit of a problem in that they play an instrument that doesn't naturally bend notes. The keyboard is digital in nature in that it gives you distinct islands rather than a continuous set of pitch possibilities. That's a disadvantage for keyboards.

What other predictions can you make for music at the end of the millenium?

You know the thing that happened with David Lynch and Quentin Tarantino? The music they put onto their records was given an extraordinary resonance by the fact that it was associated with their films. This was a trick I learned a long time ago. If you call something "music for film," that says to people, "Imagine what the film would be for this music." You evoke a whole set of imaginative skills that people have, and they think it's in the music. But it's not; it's in them. It's a trick, really, to use their own imaginations to flatter your music. What Tarantino did with the soundtrack for *Pulp Fiction*, for instance, was very interesting. He's kind of sanctified some rather nondescript music, given it a real zing and a resonance. That soundtrack is great to listen to because you know there's a story there.

So the fact that this music is now in a movie changed your perception of it.

In fact, I've never even seen the film. I've only heard the soundtrack. But as soon as I heard it, I thought, "Oh, yes. I see. I see how this could fit here." This is the way in which a sort of multimedia form will come into being — through back avenues like this.

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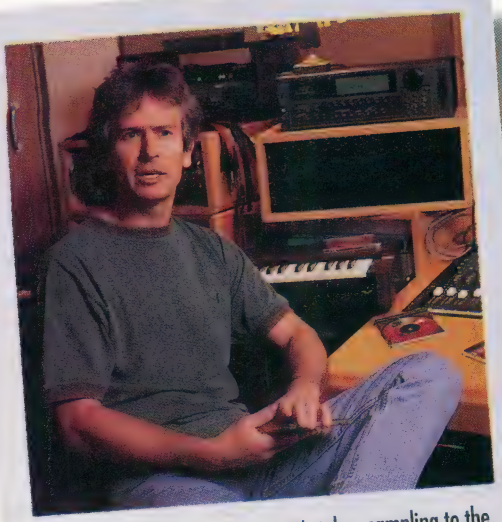

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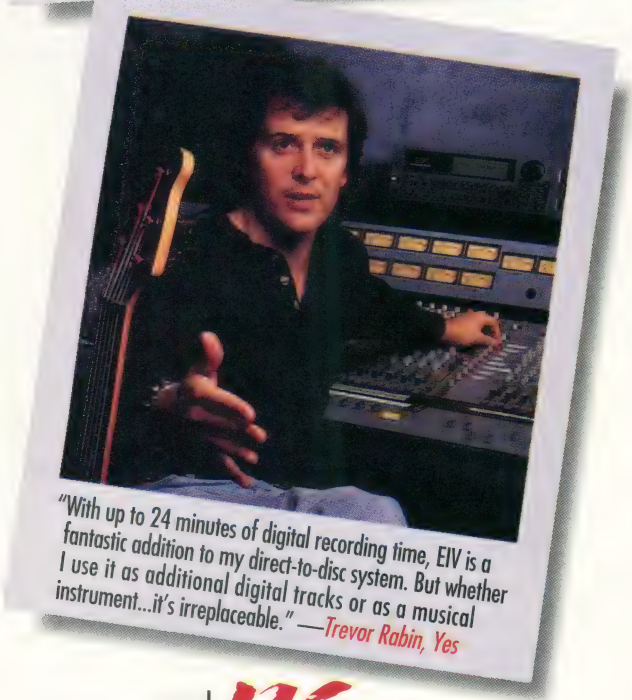

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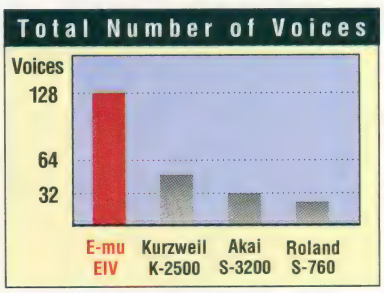

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hot tips

ROLAND JV MASTER CLASS

THE ABCs OF EDITING TONES & PERFORMANCES

BY **DOUGLAS HANSON**

There's a lot more to Roland's JV series instruments than just playing the factory presets. If you've been playing your JV synth for a few months now and you're ready to take it to a deeper level, read on; in this article we'll talk about Tone layering, controller routings, setting up Performances for sequencing, and some little-known parameters that can add new colors to your music.

The tips in this article are for the JV-80, JV-90, and JV-1000. While all these instruments are based upon the same synthesizer engine and have basically the same parameter displays, the JV-90 and JV-1000 have very similar front panels, while the original JV-80's is slightly different. If there's a difference in procedures, patch numbers, or buttons, those for the JV-80 will follow in parentheses. However, it may be necessary for you to consult your owner's manual to find the display pages under discussion.

Most of these tips will apply to the rack-mounted JV-880 as well, but its front panel is naturally compacted, though most of the parameters discussed can be accessed. The new JV-1080 is based on a more advanced processor, and though many of these tips can be employed by it as well, the JV-1080's panel and menus are significantly different. The JV-30, JV-35, and JV-50 do not provide the user access to many of the parameters we'll discuss.

Panel Tour

Before we get inside the JV, we need to be familiar with some important portions of the front panel. First, each of these instruments has mode buttons — Performance, Patch, Rhythm, and V-EXP (Performance Play/Edit and Patch Play/Edit) — that are used to select the current mode of operation. Each has eight buttons on the lower left side and eight sliders, collectively known as the Edit Palette. As you press any of the Edit Palette buttons, the respective parameter is called to the display, and the sliders can be used to edit its value. The Edit Palette buttons will call different parameters depending upon which mode you're in: Performance or Patch, Play or Edit, etc.

Also important is a set of eight Function buttons (different locations on each model) labeled TUNE, EFFECTS, CONTROL, and so on. These buttons have multiple functions as well, depending upon which mode you're in. Each is multi-labeled with a pointer to its function in each mode (color-coded lines on the JV-80).

PHOTOGRAPHY **BARRY MUNIZ**

Finally, under each display are eight buttons. In Patch mode, these are the four Tone Switches and four Tone Select buttons. In Performance, they are the eight Part Switches.

Architecture & Terminology

To make sure we're all speaking the same language, let's continue with an overview of JV terminology and the basic synth architecture. We'll begin with JV basics: Tones and Patches.

But first, just what *does* that word synthesizer mean? Let's call it a device that uses electronics to create and control sounds. JV synthesizers, like many others, create their sounds from digital recordings, usually referred to as samples or waveforms, stored in ROM memory. Those waveforms can be controlled in pitch, loudness, and frequency content, then combined to produce the sounds you hear when playing the keyboard.

How do the JV synths accomplish this? Each Patch you call up is a combination of from one to four Tones. Each Tone is essentially a complete synthesizer voice. In a tone, one of the JV's waveforms is processed by pitch controls, an amplifier, a resonant filter, two LFOs, modulation routings, and effects. (See the "Reading, 'Riting, & Roland" sidebar on page 40 for definitions and explanations of Roland synthesizer terminology.) The ability to layer these "mini-synthesizers" into Patches adds to the richness and realism of the sound.

At a higher level than the Patches reside the Performances. A Performance is a collection of seven Patches and a Rhythm Kit. Each Patch is assigned to one of the Performance's eight Parts, and can be layered, split across the keyboard, or assigned to its own MIDI channel for sequencing applications. Performances also control the JV's MIDI master controller features.

PATCH MODE

Palette vs. Patch Editing

Call up Preset Patch A17, "MIDIed Grand." The Tone Switches under the display light to indicate this Patch uses Tones 1, 3, and 4.

It's important to understand that there are two distinct methods to editing Patches and Tones on the JV synths. First, the Edit Palette is almost always active. When you first turn on the JV, your display should indicate "TVA Level," corresponding to the lighted LEVEL button in the Edit Palette. The display shows the volume level for each of the Tones. Now move sliders 1 through 4 to control the volume levels of the respective Tones (slider 2 has no audible effect, as Tone 2 is muted). This is the essence of the Edit Palette — that you have continuous access to a single parameter for all four Tones simultaneously. Simply pressing PAN, TUNE, CUTOFF, ATTACK, etc., in the Edit Palette will provide instant access to the desired parameter, and the first four sliders can be used to edit its value.

Under each Edit Palette button, however, is actually a complete menu: The up and down arrows in the display indicate there are additional related parameters. Under LEVEL, for instance, pressing the up-arrow button gets you to the TVA's Velocity Sensitivity and Velocity Curves. In fact, you can access most of the JV's editing parameters under the Edit Palette's buttons. In addition to providing for quick and easy editing, the Edit Palette is especially useful for changes during live performance, allowing you to "remix" a Patch in real time.

The second editing method is Patch Edit. Press EDIT (Patch Edit) and the TVA function button (*not* the Edit Palette button). Notice that Tone Select 1 under the display now lights, and you see "1---" above TVA and several amplifier parameters, including the same Level (Lev), Velocity Sensitivity (Vel), and Velocity Curve (Crv) values we saw for Tone 1 in the Edit Palette. Press Tone Switches 3 and 4 to mute those Tones. Now we are both listening to and looking at the values for Tone 1 only. Once again the sliders will edit the corresponding values in the display. You can also use the cursor buttons and INC/DEC buttons to change values.

Pressing Tone Select 2 changes the display to "-2--" and shows the TVA parameters for Tone 2. You can press multiple Tone Selects simultaneously to edit multiple Tones at the same time. Asterisks in the display, like "1**-", indicate that you're looking at Tone 1, but that other Tones will be edited as well. (Keep in mind that we must enable Tone 2's Tone Switch in order to hear it.) Also notice that again we have a down-arrow in the display, indicating there are more TVA parameters just a cursor-down away. To get to filter settings, tuning, or other Tone parameters, simply press the TVF, Pitch, or appropriate function button. Patch Edit is essential for honing the sonic details of an individual Tone.

Now that you have a feel for navigating through the JV's edit procedures, let's dig in and see what we can do and how to do it. We'll also make some points as to why we might want to.

Effective Layering

A key to making the most of the JV's polyphony is understanding the

role of each Tone within a Patch. Some Tones only sound at certain velocity levels, while others add subtle nuances that may be lost in the mix as you layer other sounds or instruments. These Tones are the primary candidates to be replaced by more sonically useful Tones, or muted entirely.

Within a Patch, each of the Tones uses one of the JV's 28 voices of polyphony. Our example, MIDIed Grand, uses three Tones; this allows you to play nine simultaneous notes — plenty if that's all you're asking the JV to do, but a bit restricting if you want to blend another sound, say strings, with your piano. If you were to layer MIDIed Grand with Preset B31 (B17 on the JV-80), "St Strings," which uses two Tones, you'd have a beautiful sound but only be able to play five notes before running out of voices. Unfortunately, this is how most users try to play their JVs — by layering multi-Tone patches on top of each other in Performance mode, wasting polyphony.

Since we know that Patches are already layers of Tones, let's see if we can't find a better way. In our MIDIed Grand patch, listen to each of the three Tones separately by muting and unmuting them with the Tone Switches. Now call up St Strings and do the same. Tone 1 has the left-channel strings, Tone 2 the right-channel strings. Call up MIDIed Grand again. Tone 3 has a low, round timbre that adds body to the piano sound at higher velocities. Since our strings will also add body, press Tone Switch 3 to mute it for now.

Now let's copy Tone 1 from St Strings into MIDIed Grand's unused Tone 2 location. Press WRITE, cursor to Copy, and press ENTER. The display reads "From TEMP T1 … to TEMP T1". The top line of the display is the copy source, so select Preset B31 (B17), then press Tone Select 2 so that the display reads "From B 31 T1 … to TEMP T2". Press ENTER to execute the copy.

Our MIDIed Grand now has strings on the left side. Use the Edit Palette Level controls to balance the sound to your liking, then press Pan and use slider 2 to move the strings to the center (0). If you push the slider all the way to the top, you'll access the RND (random) setting, which adds fullness to chords by randomly panning each note in the chord to a different position in the stereo field. Press EDIT, then COMMON, and rename the patch, say "String Grand," then write it to a User Patch location. You now have a sound that's nearly identical to what you'd get by layering the two original Patches in a Performance, but it has nearly twice the polyphony of the original layer.

Using the Edit Palette for Live Performance

Our new String Grand patch can also provide a good example of how to use the Edit Palette during a live performance in Patch mode. We've already determined that we can fade the strings in and out using slider 2 simply by pressing LEVEL. Pressing Tone Switches 2 and 3 will mute the strings and restore the full piano sound of the original MIDIed Grand — no additional programming necessary, and there's no need to switch to a new patch.

Another example of performing with the Edit Palette is provided by Preset Patch C31, "Touch Lead" (B77 in the JV-80). Call up this patch and notice that Tone 2 is enabled, but has 0 level. Increasing its level with the slider brings in a raspy bit of growl (caused by FXM — see page 67), adding a wealth of expressiveness to this sound. Or select Preset Patch D32, "JP-8 Pad" (B74), press Cutoff in the Edit Palette, and use sliders 3 and 4 to sweep the filters.

Unused Tones within a Patch can also store an interval tuning to quickly transpose keys or octaves. FYI: In Roland's patch library for the JV, you'll find some Patch names ending in "x4". These are preprogrammed with three similar Tones muted for quick switching or layering.

Controller Routing

Let's step back to our String Grand example. Using slider 2 to control string level is fine if we're playing in Patch mode, but what if the Patch is part of a Performance, or we're sequencing? Controlling Edit Palette Level or sending a MIDI volume message will affect the whole patch, not just the strings. Welcome to the wonderful world of controller routing.

Reading, 'Riting, & Roland

OR, WHAT DO ALL THOSE NUMBERS MEAN?

For many new owners of synthesizers, it may seem as if the instrument, the manual, and the salesperson are all speaking a foreign language. Well, I'm here to tell you — it's true! Like any art, science, sport, or hobby, electronic music has a jargon all its own, and delving into the vernacular can be an intimidating process for the uninitiated. Hopefully, the glossary below will help you in your rite of passage into Roland's digital domain of JV synthesizers.

If you're just getting started, and want to customize the factory sounds and program your own, or are just plain curious how these things work, select one of the JV's Preset Patches, a string sound or synth pad that sustains, and press the Tone Switches to mute all but one Tone so you can isolate a single sound. Press EDIT (Patch Edit) and start with the Wave/LFO parameters. Proceed from there through the TVA and TVF envelopes. Edit each parameter one at a time, listening for its effect on the sound, and reading its description in the — no, don't say it! — owner's manual. Manuals really do hold valuable information. Keep in mind that many parameters are interrelated, so adjusting one may have no discernable effect, depending on how others are set. Enjoy!

attack time: The first stage of an envelope. In the JV, attack is equivalent to T1 (Time 1) on all of the envelopes.

cutoff frequency: The point in the frequency spectrum at which the filter begins to reduce the harmonic content of the sound. When the filter is set to lowpass mode, frequencies above the cutoff frequency will be lower in volume. As the cutoff frequency is lowered, more of the highs are reduced or eliminated, making the sound darker.

envelope: A shape that is applied to each note. Usually a synthesizer's envelopes are programmed by time (or rate) and level parameters. A JV Tone has three envelopes, one each for pitch, filter, and amplitude.

filter: The function that controls the frequency content of a Tone. The filter makes the sound brighter or darker, and therefore has a powerful effect on the tone color.

LFO: Low-Frequency Oscillator. The LFO creates periodic movement, such as vibrato, during the course of a note. The JV has two LFOs per Tone. Each can be routed to control a specific destination — the pitch, filter cutoff, or amplitude.

Part: In the JV, the Part is a slot or partition within a Performance. Each of the eight Parts holds the number of a Patch, along with related parameter settings.

Patch: The basic sound that is heard when you play the keyboard; also, the group of parameter settings that defines the sound. Patches combine from one to four Tones.

Performance: The highest level of organization in the JV. Each Performance is a group of eight Parts. Performances also control the JV's MIDI parameters.

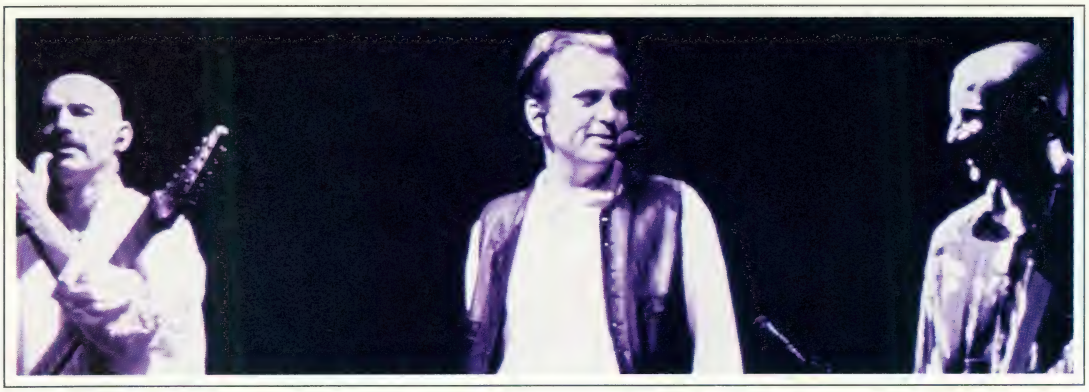
release time: The final stage of an envelope, which is triggered when the key is released. In the JV, release time is equivalent to T4 (Time 4) on all of the envelopes.

resonance: A function within the filter that accentuates the overtones near the cutoff frequency.

Tone: The primary building block of a Patch. Each tone contains its own TVA, TVF, two LFOs, choice of waveform, and other parameters.

TVA: Time Variable Amplifier, Roland's digital amplifier (equivalent to a VCA in older gear). The TVA controls the volume level of the sound over time.

TVF: Time Variable Filter, Roland's digital filter (see filter). ■



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The JVs have three controllers, two pedals, and the C1 slider, all of which can be assigned to send continuous controllers or other MIDI messages. Each Patch has three control sources — modulation, aftertouch, and expression — which can each be routed to four simultaneous destinations *per Tone*.

As an example, call Preset Patch B64, "Harmon Mute1" (B43). Sustain a single note, then push the modulation lever forward. You'll hear a growl and a bit of vibrato. To see how this is accomplished, press EDIT and the Control function button, then cursor down until the Modulation Destination Depth screen appears. If its not already lit, press Tone Select 1 so that "1---" shows in the upper left, indicating that the Tone 1 values are displayed. The display tells us that modulation will increase the level (LEV +63) of Tone 1, and cause its pitch to be altered by LFO 1 (PL1 +2). Pressing Tone Select 2, "-2--", shows that modulation has no effect on Tone 2. If you want to tame the growl, lower the +63 to about +25.

Press Patch (Patch Play) and return to our String Grand patch. Let's assign the C1 slider to transmit expression and have it control the level of our strings. Press Control and cursor down until the C1 Assign display appears. Cursor right and set the mode to I+M (both internal control and MIDI out) and the Assign to CC11/Expression. The Value will be set in performance by the C1 slider position, so the parameter field on this screen is blank. Press Control to exit. Controller assignments are system parameters, and don't need to be written into memory — they will remain until you change them.

In our String Grand patch, with Edit Palette Level selected, bring slider 2 to 0 to temporarily silence the strings. Press EDIT and Control (Patch Edit and Control), then cursor down until the Expression Destination Depth display appears. Press Tone Select 2 to route the signal to the strings. Press INC until the first OFF changes to LEV. Cursor right and give it a positive value, say +32. Now the C1 slider will control the string's level. Write this expression routing into memory as part of the Patch, and you can have this same control in Performance mode, or send a CC11 message from your sequencer to control the string's Tone individually within this Patch.

In addition to level, the modulation, aftertouch, and expression control inputs can be routed to your choice of 11 other parameters, such as pitch, cutoff, resonance, and LFO rates or depths, providing a wide range of expressive controls. Also note that you have negative, as well as positive, depths, so you can crossfade Tones, open and close filters, or slow an LFO while increasing its depth, all from a single controller.

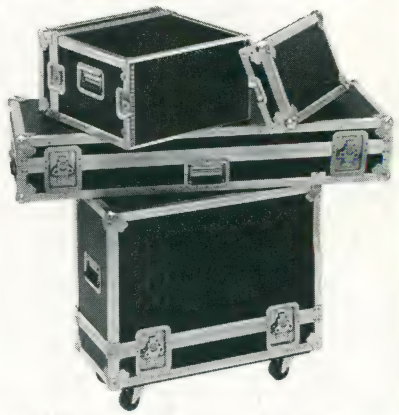
Effective Panning

If you've tried sending panning messages to your JV, you may have been puzzled by some mixed results. The effect seems to work great sometimes, but so-so or not at all other times. For example, select Preset Patch D11, "Beauty Vox" (B34). Assign the C1 slider to CC10, or send pan control data from your sequencer. Moving the slider produces some panning, but not a clean left/right separation. To find out why, we once again need to dig into our Tones.

After exiting the Control page, press Pan in the Edit Palette. You'll see that the three active Tones are widely spread across the stereo field, with values of RND, 63R, and L64. This initial placement provides a lush-sounding patch, but prevents a full left to right pan, as the pan message can only move the Tones on the extremes back to center. Use sliders 1 to 3 to give all Tones a 0 Pan value. Now the C1 slider will provide a more prominent left or right movement. The Patch also has a master pan setting under EDIT and Common (Patch Edit and Common), but this is virtually always set to center, 0.

The JVs also have stereo effects processing, so the reverb and chorus will diffuse a hard left pan slightly back into the right channel and vice-versa. If you want to treat the JV's stereo outputs as two individual outs, you'll need to eliminate the effects sends for each Tone. From Pan in the Edit Palette, cursor up twice and zero out the Chorus Sends, then cursor up once more and do the same for Reverb. You now have true left and right separation. These changes can be saved into individual Patch memories.

One final note on panning: If after all this,



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you find a sound is not staying panned as you play it, check each Tone's Pan Key Follow. This parameter allows the specific notes you're playing to control the pan position of the Tone. For example, a piano sound may sound to the left on the low end and move to the right as you play up the keyboard. Press EDIT and TVA (Patch Edit and TVA). The first display has the P-KF parameter. A 0 value means keyboard position will not affect panning.

Special JV Features

To conclude our section on Patches and Tones, let's take a look at some applications of the JV's lesser known and/or unique abilities.

Tone Delay

While some of the factory patches use the reverb processor for delay, this creates a dilemma when sequencing, as the Performance only has one reverb processor, and you may not want delay on all eight Parts. Hmmm . . . how about using those four Tones and Tone Delay to build your own delay? Call Preset Patch A71, "Nylon Gtr 1" (B51) and copy Tone 1 to Tones 2 through 4. (Unless you want the echoes to bounce around at random in the stereo field, it might be a good idea to change the RND pan to 0 before doing the copy operation.)

Press Level in the Edit Palette and set Tone 2 to 40, Tone 3 to 22, and Tone 4 to 6. Cursor down to Tone Delay Time and set them to 0, 32, 64, and 96 for Tones 1-4 respectively. *Voilá*, instant delay! Adjust the Tone Delay Time to suit your song tempo, or each Tone's Pan position to have the delays fade across the stereo field. To save polyphony and prevent the delay from muddying up faster passages, press EDIT and TVA, and cursor down to Delay. Press all four Tone Selects simultaneously, "1***", and set the mode to Hold. Now the delay Tones will only sound if the note is sustained through the Tone Delay Time.

FXM

FXM stands for Frequency Cross Modulation, which sounds quite technical but is really quite simple. FXM uses a square wave to modulate the selected waveform, which creates new harmonics, essentially creating a new waveform. Waveform modulation was common on analog synths, but is not so common on instruments that make use of complex digital waveforms. We've already discussed two Patches that make use of FXM, Touch Lead and Harmon Mute1. Press EDIT, then the Wave/LFO function button, then cursor down to FXM. Simply turn it on and set its Depth. The results can vary by waveform, depth, and pitch, but FXM is great for adding growls to saxes, or some extra bite to synth sounds. I'll leave you to experiment.

Analog Feel

Many of the pad sounds on the JV employ an effect called Analog Feel. This produces irregular variations in pitch and level to emulate unstable

analog oscillators. These subtle (or drastic, if you overdo it!) variations help to produce the trademark warmth of analog synths, as well as the natural pitch variation of percussion. This parameter can only be accessed in Patch Edit, but once stored into a Patch it is carried over to the Performance. Press EDIT and Effect and cursor down to Analog Feel. Again, I'll leave you to experiment on your own.

Release Velocity

In addition to being velocity- and aftertouch-sensitive, the JV keyboards also transmit release velocity. Depending on your playing style, this can take some getting used to, but it's another source of nuance that can make a difference, especially on acoustic instrument simulations — bows and fingers don't leave strings identically each time, nor does breath expire through a reed or valve with digital precision! Return to B31, "St Strings" (B17). Play and hold a chord, then lift your hands off the keyboard as slowly as possible. Play the chord again, lift your hands quickly, and listen for the difference in release time. If you have trouble hearing the difference, muting the reverb may help. To program release velocity sensing, press EDIT and TVA, then cursor down to TVA-ENV and adjust the Velo-T4 values. Negative values will make the release time shorter as you produce higher release velocities by letting the keys off more quickly. Release velocity can also control the release times of the pitch and filter envelopes.

Redamper

The JV-90 has this new feature that was not found in the previous JVs. Typically, a damper pedal allows you to sustain notes in place of physically holding the notes. Redamper allows you to sustain notes that are in the process of dying away if you press the pedal after you've removed your hands from the keyboard. Turn Redamper on under EDIT and Control, then cursor down to the Pedals display. Make sure your Tone(s) have sufficient release time (TVA ENV T4), so you can catch them as they fade. If the filter envelope also shuts off the tone, adjust TVF ENV T4 as well. Try the Redamper switch on our String Grand patch, and remember that this is a per-Tone parameter. It could be helpful when changing sounds in live performance, along with the JV's natural Patch Remain ability to continue sustaining notes from the previous Patch when a new Patch is selected. When using Redamper on a pad sound, you may have to adjust your pedal technique so as not to build up muddy cluster chords.

PERFORMANCES

Time to shift our attention to the JV's Performance mode. Performances allow the JV to transmit and receive on up to eight MIDI channels, send multiple program and volume messages to control other sound sources, and set key ranges for both internal and external sounds. However, as with Patch mode, there are some intricacies

to making the most of these features. Press Performance (Performance Play) and read on.

Performance Zones & Key Modes

First, it's important to understand that there are three components to each Performance: Tx Zones, Int Zones, and Parts. Tx Zones control what is transmitted out MIDI — which MIDI channels data is to be sent on, which volume, pan, or program changes are to be sent, and also the velocity sensitivity and curves to be used, along with the key ranges used to control external sound sources. Int Zones control the same parameters — channels, velocity controls, key ranges, etc. — for the internal sounds being played locally by the keyboard. Parts control the sounds being played via the MIDI in: patch selection, level, pan, tuning, and MIDI receive switches.

These three components interact differently depending upon the Performance's Key mode. Each Performance is assigned one of three Key modes — Layer, Zone, or Single. Layers and Zones are the main master controller modes, with Tx Zones, Int Zones, and Parts all available. They are very similar except that Layers ignore the Tx and Int Zone's key ranges; all sounds are layered across the entire keyboard. Singles are optimized for using the JV with a sequencer, and are quite different from Layers or Zones. In Single Key mode, both the Tx and Int Zones are disabled. Only the Part selected by the cursor in the display will be played, and the JV will change its MIDI transmit channel to the MIDI receive channel for that Part, making it quite simple to change channels to communicate with different instruments in your sequence.

For a quick example of these Zones and Key modes in action, pull up Preset Performance A01, "Jazz Split." Press EDIT and Common (Performance Edit and Common), then cursor down to see the Key mode, which is Zone. Now press the Int Zone button, and you'll see that Parts 1 and 2 are active, as shown by the lighted Part Switches under the display. The lighted switches indicate that you're playing two of the JV's Parts. Pressing Part Switch 3 will enable a third sound on the keyboard. Press Tx Zone and the same two Part Switches are lit, indicating that you're transmitting MIDI out on two channels as well. Press Part and all eight Part Switches light to show that all of the Parts are available to receive MIDI data. The JV-90 and JV-1000 have convenient Tx-Local-Rx switches near the Edit Palette, which allow you to quickly check the status of all three components. Pressing Tx shows the Tx Zones, both lighted shows the Int Zones, and Rx lit shows the Part receive switches.

Now that we've dissected a Performance, please note that the Edit Palette is still active in Performance mode, albeit with a new set of parameters for Performances. The Level button will control the level of the internal sound source only, but you can send MIDI volume messages on any of the active Tx Zones by pressing Tx Vol in the Edit Palette and moving

a slider. In our Jazz Split example, slider 1 will send MIDI volume on channel 1, slider 2 will send on channel 2. Enabling all eight Tx Zones turns the Performance into an eight-channel MIDI mixer – handy for controlling external modules in live performance or recording volume messages into a sequencer.

Using Preset Performances

Programming a Performance from scratch can be a bit complicated, so I take advantage of the Preset Performances whenever possible. For example, I always start with A01 Jazz Split when I want to setup a split keyboard, because about 90% of the programming is already done for me. I simply need to choose the sounds and I'm done. My sequencing template is built around A08 Fusion Set, a Single Key mode Performance ready for sequencing. If you're looking to construct your own Performance, check the Presets first to see if there's one that has the Performance attributes (i.e., key mode, key splits and velocity response) close to what you're looking for, and use it as a template.

Real-Time Patch Editing

One of the JV-90's and JV-1000's best kept secrets is their ability to edit a Patch from within a Performance. (Sorry, the JV-80/880 do not have this ability.) Call up Preset Performance A08 Fusion Set, and cursor to the bass patch on Part 2. Hold ENTER and press the Patch mode button. The display shows the Thumpin Bass and looks like it has returned you to Patch mode. The Performance is still active, however, you just can't see it! But you can hear it if you're playing a sequence, and you now have all the Patch Edit Palette and Patch Edit controls available so you can tweak your sounds in context as the music plays – lower a cutoff frequency here, add a little resonance there, reduce a release time as needed. The P(2) in the display indicates you're editing Part 2 of the Performance. Just press Performance to return to the normal Performance displays.

Chorus & Reverb Controls

The Performance Part's effect sends have been a source of confusion for a number of users. Back in our Fusion Set Performance, cursor left to play the MIDIed Grand patch on Part 1. Press Level in the Edit Palette and cursor down four times to the Reverb switches. Hmmm . . . just off and on? Turn it off. Hmmm . . . still hearing some reverb on the piano?! The reason for this lies in the Chorus's output. Press EDIT and Effects (Performance Edit and Effects) and we'll see that in this Performance, the Chorus is sent out through the reverb, Out=REV. So even though we disabled the Parts Reverb switch, this patch had tones routed to the chorus, as well, which were in turn sent through the reverb. Changing Out to MIX will kill the reverb entirely, and separate the Reverb and Chorus sends. By the way, you can use CC91 to control the Reverb Switch and CC93 to control the Chorus Switch via MIDI. Value 0 for Off and 127 for On.

Okay, so we can turn reverb off and on for the Part, but how do we control the depth of reverb somewhere in between? This is another example where we need to edit a Patch from within a Performance. On the JV-80/880, you must edit the Patch, then Write it into a User Patch location in order to hear your changes in a Performance. Since each Tone within the Patch has its own Reverb Send Level, we can't properly control reverb depth from a single value in the Part. Press Pan in the Patch Edit Palette and cursor up to Reverb Send Level. The sliders will control the reverb depth for each Tone. The Patch Reverb and Chorus Sends, Edit and Effect (Patch Edit and Effect) are disregarded in Performance mode.

OUTRO

I hope these ideas have helped you gain a better understanding of your instrument, and inspired some creative ideas of your own. Experience is the best teacher, so I encourage you to experience the magic of mastering your JV!

Douglas Hanson is Product Specialist Manager for Roland Corporation U.S. He spends way too much time with the wrong kind of keyboards — ASCII — but finds time now and then to take a synth or two through its paces.

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By Greg Rule

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$2,500 with stand. RE1 Remote Editor: $250. Other Wavedrum accessories include FC6 Foot Controller ($225), XVP-10 ($165) and EXP-2 ($85) expression pedals, TA-WD1 tilt adapter ($75), PH-WD1 pipe holder ($50).

CONTACT
Korg USA, 89 Frost St., Westbury, NY 11590. (516) 333-9100; fax (516) 333-9108.

When Korg gave us a sneak preview of their Wavedrum last year, we were amazed — but skeptical. A packed demo room at a trade show isn't the best place to get the real low-down. Was this thing truly capable of responding to brushes, fingers, hands, and sticks as sensitively as Korg's demo made it seem?

One touch was all it took. When the Wavedrum turned up at our offices nearly a year later and we actually got to play the thing, our attitude quickly changed from "show me" to "hell yes." It was a religious experience. Delicate brush sweeps. Intricate finger taps. Rubs. Scratches. Full-impact stick hits. Buzz rolls. Slaps. You name it. Whatever we threw at it, the Wavedrum interpreted spot-on.

Just to make sure we weren't on a caffeine high, we invited Santana's percussionist Karl Perazzo over for a second opinion. A true hand-drumming expert, he proceeded to pummel the instrument for the better part of three hours. Read his comments on page 74.

Since the Wavedrum contains its own internal synthesizer — and an impressive one at that — you can get up and running with one simple audio connection to a sound system, or by plugging a pair of headphones into its phone jack. Korg ships the unit with 100 factory-programmed patches that range from authentic hand drums to far-out special effects. All can be customized, if desired. We'll get more specific about the sounds and programming capabilities below.

What makes this instrument so impressive is the accurate and sensitive way that it captures the player's performance, and how its internal synth engine responds to that information. Let's take a look at the whole mouthwatering process from top to bottom.

Start Me Up. Anyone who's ever rolled their fingers on a tabletop and wished they could find a device responsive enough to interpret those motions is in for a treat. The Wavedrum's sensitivity and speed are frightening. An engineer at Korg reports that the instrument is capable of 100-plus decibels of dynamic range. In our playing experience, it's without question the most responsive electronic percussion device we've ever played.

Two rims are included with the unit: a contoured "low-rider" rim for conga-like hand drumming, and a removeable "raised"

The Wavedrum (shown player's view, front, and rear) houses a DSP-based synth engine capable of physical modeling. The engine is driven by four internally mounted PZM microphones. Delicate brush sweeps. Intricate finger taps. Rubs. Scratches. Full-impact stick hits. Buzz rolls. Slaps. Pops. You name it. Whatever we played, the Wavedrum interpreted, spot-on.

rim for those who want to play with sticks (see Fig. 1). The latter has two notched strips along its outer edges for guiro-like playing techniques. The Wavedrum's standard 10" drum head is tunable and replaceable.

Unlike most synths, samplers, and sound modules that have fixed oscillators, the Wavedrum relies on the ever-changing energy that occurs at its surface to excite its electronic innards. If you shout into the Wavedrum's head, it will react. If you slide your palm across its surface, it will react. If you push it, poke it, scratch it, or slap it, it will react. Hitting it with a wooden stick will result in a sound that's colored differently than if it was struck with a hand, a metallic object, or whatever.

Sensitivity of this kind can have its drawbacks, though. Loud stage monitors or the stomping of feet on a wooden floor, for example, can excite the Wavedrum. One Wavedrum user told us he once had to muffle the instrument's head to keep it from reacting to a nearby bass amp. But, hey, drummers have had the same problem with buzzing snare drums for years.

Four PZM microphones are mounted inside the Wavedrum for capturing the player's performance: three in a triangular array inside the body, and one under the logo plate (located opposite the LED, see photo). Three more are positioned inside the removable raised rim. The mics not only act as triggers for the internal synth, but also as carriers of acoustic signals; in some Wavedrum patches, this direct audio information is blended with the synth sounds.

So how does the Wavedrum do what it does sound-wise? Math, math, and more math. It is the first instrument in Korg's product line to feature their proprietary DSP-based synthesis system. Without getting too mired in technospeak, let's just say the Wavedrum's engine is capable of recreating mathematically a world of expressive timbres, ranging from physically modeled acoustic instruments to various synth sounds, including analog and FM. Scary. Every new engine needs a name, so Korg dubbed this one state-variable, or SV for short. There are 62 factory-programmed algorithms onboard, each providing various combinations of the above synthesis types.

As with any proprietary technology, especially a new one, Korg is keeping the details of this architecture close to their chest. For those unfamiliar with algorithms and physical modeling, we offer this two-sentence crash course: Complex computer algorithms (consisting of a wide array of mathematical filters, mixers, oscillators, and the like) are used to describe the sonic and performance characteristics of an actual acoustic instrument. Unlike samples, which are one-dimensional audio snapshots of a sound, physical models change constantly according to performance gestures, much as an acoustic instrument would. (For further reading, refer to "The Next Big Thing," our Feb. '94 cover story. On page 103 you'll see four screenshots from Korg's Synthkit, the software used to create the Wavedrum's algorithms. You might also want to peruse "The History of Physical Modeling," Sept. '94, and our review of Yamaha's VL1, June '94.)

Programming. Any Wavedrum owner interested in programming his or her own sounds will need Korg's RE1 Remote Editor. Without it, only three parameters can be tweezed: tune, decay, and a predetermined "other" parameter which, according to Korg, was chosen because it makes the most dramatic change to the sound. In the case of the Wood Drum patch, for example, it's drum type. For the Beast patch, it's growl amount.

KORG WAVEDRUM

PROS
Amazing control, dynamics, and response. Wildly expressive sounds. Intuitive programming with RE1 remote.

CONS
Pricey. Audible popping sound when switching between patches. Won't recognize MIDI note-ons or aftertouch.

BOTTOM LINE
This is the future of electronic percussion.

With the RE1 connected, you can access up to 11 parameters per patch. The number and types of parameters vary from patch to patch. Some parameter names are familiar: filter cutoff, LFO depth, LFO rate, and the like. Others aren't so typical: Snap, Bark, Crunch, Pluck, Cannon, Tension, Stuffing, and more.

What do these oddball parameters do? In most cases, their effects are pretty true to their names. The Udu patch, for example, is a physical model of a ceramic pot, so the parameters relate to the actual, physical characteristics of the pot and the way it is struck. Its parameter set includes clang type, color, and size. Clang type, used in conjunction with the pitch parameter, gives the sound a more metallic overtone content. Increase clang color and the sound shifts to a more resonant metallic tone, as if the side of the pot was being struck. Clang size simulates changing the diameter of the pot.

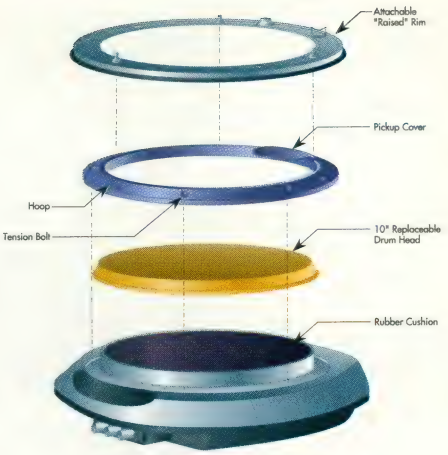


Fig. 1. An exploded look at the Wavedrum's rims, head, and body. If you want to play with sticks, the uppermost rim attaches directly to the conga rim and connects electronically to the Wavedrum via a rear-panel input.

On the left side of the RE1's front panel are six function buttons for selecting modes. Press F1 and you'll be whisked into Play mode, a simple screen where several of the Wavedrum's front-panel functions can be accessed (patch select, tuning, decay). F2 takes you into the multi-layered Edit mode, where most of the sound-shaping procedures are performed. When you press F2, the current algorithm number is displayed. A second later it disappears and the Sound Edit parameters appear. If you move one of the RE1's sliders, the corresponding parameter name will appear on the top line of the LCD. Handy.

When deciding what parameters to include in the final editing set, Korg's engineers were faced with the daunting task of narrowing hundreds of options down to a handful. Being the tweakaholics that we are, we wish we could get our arms and elbows into the depths of the algorithms, but that would most likely spell trouble. Tweezing the wrong parameter of a physical model could instantly turn a pleasant timbre into a garbled wheeze — or cause the sound to go away completely. To Korg's credit, the parameters they do provide are diverse enough to keep programmers up to their elbows in new sounds for years.

We had a blast programming this instrument. Being able to change, for example, the tension of a snare drum's wire strands or its shell size via software was a spine-tingling affair. Likewise, flipping through the screens and coming across such items as Bark and Crunch brought a smile to our faces. Overall, editing Wavedrum sounds is a fun, intuitive, exciting process.

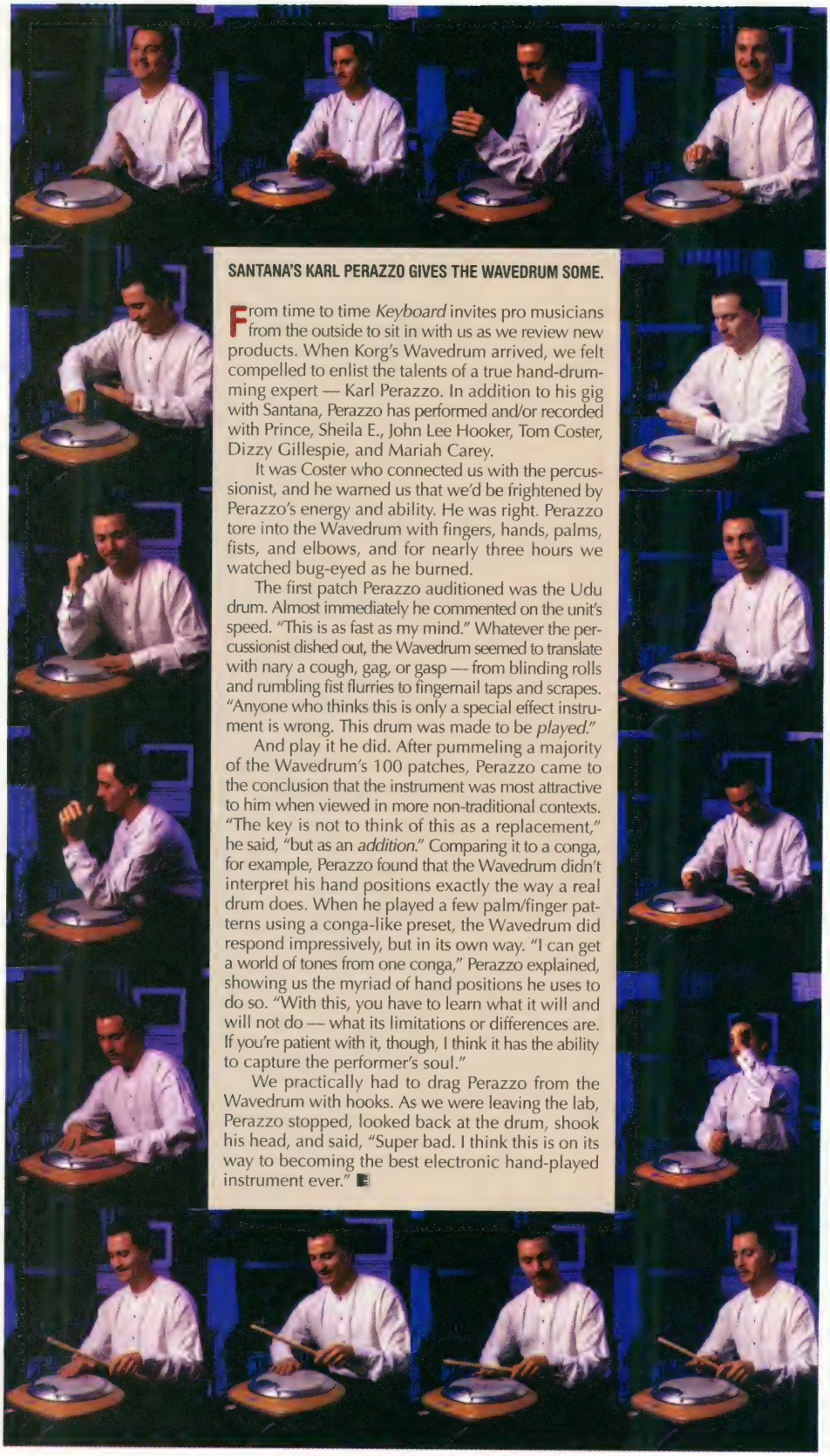
The next editing page, Edit Pedal, lets you assign any two of the available algorithm's parameters and their ranges to the expression pedal. Those assignments are stored with the patch. The pedal is very useful when sim-

PHOTOGRAPHY: **WARREN HUKILL**

ulating effects such as talking drum pitch-bends or synth-like filter sweeps. Korg's XVP-10 and EXP-2 expression pedals, or equivalent, are compatible with the Wavedrum. Though the drum's back panel doesn't say so, you can plug Korg's FC6 footpedal into the RE1 jack for hands-free patch selection.

Continue to scroll upward through the editing layers and you'll find Edit Pressure (for aftertouch sensitivity from the drumhead), Edit Output (for setting the overall output level), and Rename/Write (for naming, saving, and comparing patches). In the F3 Layout mode you can perform such utilitarian functions as patch swapping, copying, and recalling of factory patches. F4, the MIDI mode, is something we'll address later. The F5 and F6 keys aren't active.

Sounds. The beauty of the Wavedrum is its ability to change colors like a chameleon. The Udu drum patch, for example, is full of subtle surprises. Thump the middle of the head for a basic tone. Dig into the head with your fingers or palm and then release quickly to bend the pitch upward. Tap gradually from the center of the head to the outer rim and the sound will change smoothly from a round tone to a biting, edgy timbre. Sweep the expression pedal to bend the pitch up or down. The quality of the sound is crisp and clear.



SANTANA'S KARL PERAZZO GIVES THE WAVEDRUM SOME.

From time to time *Keyboard* invites pro musicians from the outside to sit in with us as we review new products. When Korg's Wavedrum arrived, we felt compelled to enlist the talents of a true hand-drumming expert — Karl Perazzo. In addition to his gig with Santana, Perazzo has performed and/or recorded with Prince, Sheila E., John Lee Hooker, Tom Coster, Dizzy Gillespie, and Mariah Carey.

It was Coster who connected us with the percussionist, and he warned us that we'd be frightened by Perazzo's energy and ability. He was right. Perazzo tore into the Wavedrum with fingers, hands, palms, fists, and elbows, and for nearly three hours we watched bug-eyed as he burned.

The first patch Perazzo auditioned was the Udu drum. Almost immediately he commented on the unit's speed. "This is as fast as my mind." Whatever the percussionist dished out, the Wavedrum seemed to translate with nary a cough, gag, or gasp — from blinding rolls and rumbling fist flurries to fingernail taps and scrapes. "Anyone who thinks this is only a special effect instrument is wrong. This drum was made to be *played*."

And play it he did. After pummeling a majority of the Wavedrum's 100 patches, Perazzo came to the conclusion that the instrument was most attractive to him when viewed in more non-traditional contexts. "The key is not to think of this as a replacement," he said, "but as an *addition*." Comparing it to a conga, for example, Perazzo found that the Wavedrum didn't interpret his hand positions exactly the way a real drum does. When he played a few palm/finger patterns using a conga-like preset, the Wavedrum did respond impressively, but in its own way. "I can get a world of tones from one conga," Perazzo explained, showing us the myriad of hand positions he uses to do so. "With this, you have to learn what it will and will not do — what its limitations or differences are. If you're patient with it, though, I think it has the ability to capture the performer's soul."

We practically had to drag Perazzo from the Wavedrum with hooks. As we were leaving the lab, Perazzo stopped, looked back at the drum, shook his head, and said, "Super bad. I think this is on its way to becoming the best electronic hand-played instrument ever." ■

Half the fun is discovering how each of the Wavedrum's patches will respond to different playing techniques. If you take whacks at the drumhead with the Monsoon patch selected, you won't hear a peep. Press and hold the head though, and a wind-like howl will fade in. The harder you press, the more ferocious the storm becomes. Pound the head with your free fist to introduce a low rumble.

For your standard conga-like sound, the Wood Drum is the ticket. Tap the head dead center and you'll get a clean, open tone. Apply the slightest bit of pressure with your other hand and you'll choke any sustaining note(s). Dig your palm into the head while tapping with the other hand and you'll hear the sound choke and rise just as it would on the real thing. The expression possible with this patch is frightening. Ditto for the wonderfully twangy Tabla, H20 Bottle, and Bodhran.

Friction is the name of the game when using the Scratch patch. Rather than beating the head, try pushing and pulling your hands across it, just as you would an LP on a turntable. Wicka-wicka-wick. The Fly is another friction-based patch. Rub the drumhead to hear the pesky insect take flight. Smack it once for a deathly splat.

Some algorithms provide more than one basic sound type. Sawari-A, for example, provides a tabla-like tone atop a droning synth fifth. Mardigra is a mixture of jingly sleigh bells and clay-like hand drum. These elements are hard-wired at the

PHOTOGRAPHY: **WARREN HUKILL**

factory, so you can't randomly pick and choose layers. We hope Korg will develop future sound sets that offer new algorithms and layers.

A couple of algorithms use the Wavedrum's auto-scale capability. (There are eight scales available: pentatonic, Ryuku, Gamelan, Indian, whole-tone, major, combination diminished, and tonic only.) Sawari-B, for example, provides a sitar/tambura combination. In this case, the tambura is programmed to drone while the sitar's pitch is allowed to change according to the chosen scale. Both pressure and pedal movements will determine the sitar's pitch.

There are other melodic gems onboard the Wavedrum, as well. The parameters of the Bass Seq patch include string color, string tension, and five pitch selections. If you play delicately or at a slow tempo, the pitch will stay the same. If, however, you play fast and with varying dynamics, the Wavedrum will spit out various combinations of the five chosen notes. We heard some pretty frightening bass lines from this patch.

One patch, Wave Seq, allows you to solo atop a basic drum beat. Play the Wavedrum at low to medium dynamic levels to access a generic drum tone. Give the head a sharp smack to start the stereo drum groove. With the RE1, you can choose one of four motifs and change the pitches of their components. Tempo can be changed via the decay parameter.

The Caxixi is an excellent shaker-type sound (move the expression pedal to loosen or tighten the beads), but listen closely when you sweep the pedal and you'll hear a zippery sound. According to Korg, this happens in certain patches when the Wavedrum is forced to process massive amounts of numbers in relation to each increment of the pedal's path. This noise surfaced again in some patches as we made quick movements with the RE1's data sliders. Once you stop the movements, the offensive racket disappears. But for those of you who enjoy laying occasional tracks with one hand on the instrument and the other on the knobs and sliders, this side-effect could be an occasional source of irritation.

On a similar note, the Wavedrum outputs an audible popping sound whenever a new patch is selected. Depending on the energy present in the system at the time of the switch, the loudness of the pop can vary. This might not bother some players, but if you want to change patches in mid-song — especially if you're involved in a quiet, sensitive recording or performance setting — it could be a problem. One final nag: Sustained notes are abruptly cut off when you change patches.

If you're accustomed to sampled percussion devices that choke, cough, or gag when you feed them too many notes at a time (try

playing a cymbal roll on a sampler and you'll get the picture), take heart. No matter what Wavedrum patch you play, you'll be hard-pressed to hear anything that resembles those types of note cut-offs.

What sounds won't you find in the factory group? Cymbals, for one. There is a PCM-based hi-hat, and a couple of FM-sounding gongs, but there are no real cymbals to speak of. And with the exception of a snare drum or two, none of the Wavedrum's drum kit sounds (kicks and toms) are worth writing home about.

After testing the unit with the low-rider conga rim for a couple of weeks, we unboxed the raised rim, screwed it on, and gave the factory presets another go-around. The add-on rim gave a few of the previously lackluster sounds a new lease on life. Example: Tweeter. Without the rim, it's a forgettable, obnoxious high-frequency effect. With the rim, a cacophony of swelling sound emerges as you rub drumsticks back and forth over the rim's ridged surfaces. Ditto for the Drum Kit patch. Without the rim, you'll only hear a snare drum on the head and a sickly, pedal-controlled kick drum. With the rim attached, you can access a variety of open and closed hi-hats. By the way, whenever an algorithm incorporates the raised rim, an LED marked Rim will illumintate on the Wavedrum's front panel.

With sticks in hand, we attacked several of the snare drum patches hoping to hear a killer emulation of the real thing. No major complaints hitting the head. But when we nailed a few rim shots, the Wavedrum gave us a sickly ping, not the shotgun-like crack we'd expected. Apparently that particular timbre is not part of the snare drum algorithm.

If you're interested in electronic percussion strictly as a drum set replacement, we suggest you look into the Swedish ddrum system instead. As it stands, we feel that the Wavedrum works best as a solo percussion instrument — not as a drum set simulator. The physical design of the unit alone is enough to make this point clear.

MIDI. As we mentioned earlier, the F4 button on the RE1 accesses the Wavedrum's MIDI mode. Here you can perform such basic chores as setting a global or patch-specific MIDI channel, assigning each patch a MIDI note number, programming the expression pedal to modulate a MIDI device, enabling or disabling sys-ex reception, and instigating or receiving data dumps. Nothing particularly fancy.

One quick glance at the MIDI implementation chart makes it clear: The Wavedrum isn't intended to do much in this department. Sorry, it won't recognize incom-

ing note-ons or aftertouch. The only real purpose MIDI serves on the instrument is for sending and receiving patch data, for very basic external triggering, or for receiving offsite controller streams for random/experimental-type effects.

Korg makes no bones about it — the Wavedrum isn't a MIDI synthesizer in the traditional sense. Many of the nuances and colors that make the instrument so expressive just aren't adaptable to the MIDI world. It needs live energy at its head and rim in order to do what it does, and we can live with that.

Just for kicks and grins, we connected the Wavedrum's MIDI output to our sequencer and recorded a few simple passages, some with the pedal, some without. Afterwards, when we opened the event editor and took a microscopic look at what the Wavedrum had just output, our jaw dropped. There were pages upon pages of densely packed pressure and modulation messages following each note — enough to suffocate many modules. Not quite what we'd expected.

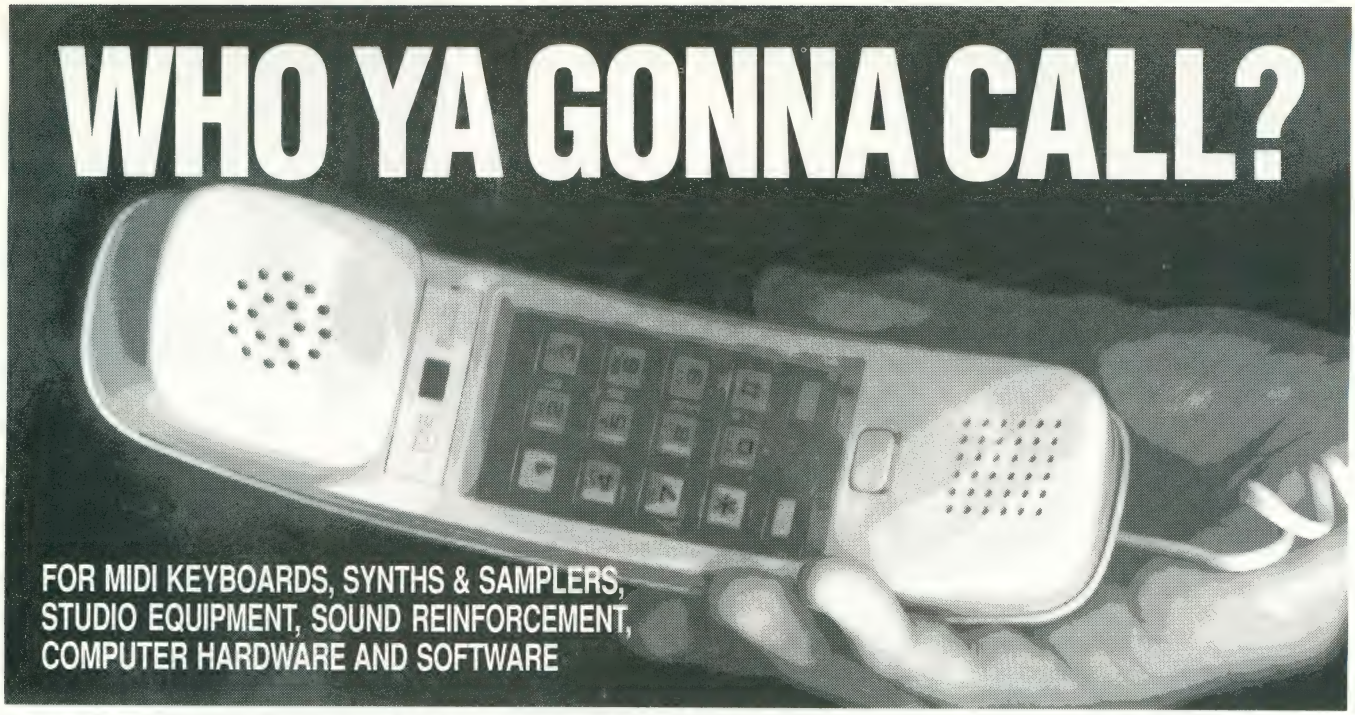
When we played the data back into the Wavedrum, it ignored the note-ons, no surprise, but it did respond to the modulation data. As we played a steady pattern, the drum's pitch began to rise and fall. This process might be useful in an experimental music situation, or, hmm, if we break our legs.

Conclusions. The Wavedrum is easily the most expressive and sensitive electronic percussion instrument we've ever played. From the most intricate finger patterns to thunderous two-fisted rolls, the Wavedrum interpreted darn near every nuance we fed it. Of course, this kind of power doesn't come cheaply ($2,500 for the drum and another $250 for the editor), but compared to the cost and hassle of schlepping a truckload of instruments to the studio or stage, it could be considered a bargain.

While the Wavedrum excels in the hand-drumming realm, its drum set emulation leaves a lot to be desired. Fortunately it goes far beyond merely simulating acoustic instruments. Its DSP-based engine is capable of astonishing electronic acts, both familiar and unfamiliar. We're looking forward to seeing how Korg implements this technology in other instruments.

Let us repeat, the Wavedrum is not a MIDI-savvy instrument. It relies entirely upon live energy at its surface to do what it does. So don't buy it expecting to record and play back MIDI performances. But even if the Wavedrum had no MIDI capabilities, we'd still be singing its praises. Plain and simple, this is the future of electronic percussion. ■

WHO YA GONNA CALL?



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Turtle Beach Quad Studio

MULTITRACK HARD DISK RECORDING SYSTEM (PC)
By Michael Marans

It may be a bit ironic that Turtle Beach, noted for some time as having the most expensive computer soundcard on the market (albeit the one with the best audio specs) should be the company that's first out of the gate with a truly affordable multitrack hard disk recording system. With a user interface based on the familiar Portastudio multitrack cassette recorder, a soundcard for an audio engine, and a $499 price tag, there's no doubt that Quad Studio is geared for the masses. Now the big question: Are its audio fidelity and feature set up to the demands of pro musicians and multimedia developers?

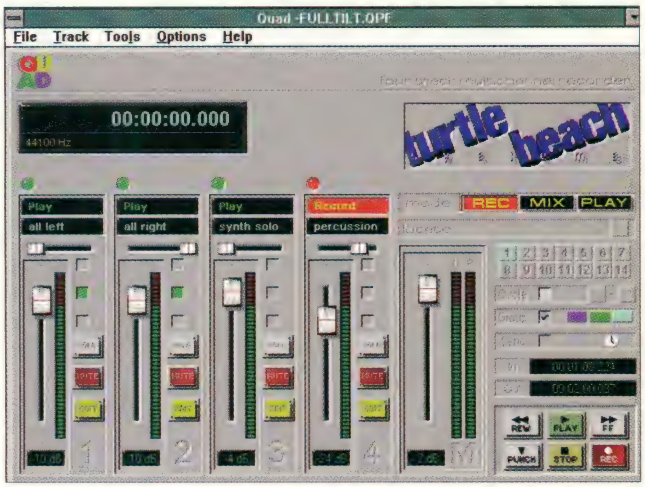

Fig. 1. Quad Studio can be operated in either of two modes: "beginner" or "expert." The latter mode, shown here, provides access to a greater variety of functions. Each of the four tracks has volume and pan sliders, mute and solo buttons, and an edit button, which, when pressed, switches you to the waveform editor of your choice. The small boxes just underneath the track names are for assigning the channels to groups. In this example, the volume sliders of tracks 1 and 2 are grouped for simultaneous control. Track 4 is in record-ready mode. Record punch-in/out times are shown immediately above the transport controls.

Overview. Quad Studio hardware consists of Turtle Beach's Tahiti soundcard — the successor card to the company's popular MultiSound. Unlike the MultiSound, which featured a built-in E-mu Proteus, the Tahiti has no on-board synth. You can add one, if you like — the Rio. When you buy a Tahiti and a Rio together, you get a package called a Monterey. We reviewed the Monterey as part of our Oct. '94 soundcard roundup. In case you've misplaced your issue, we'll recap our findings: The Tahiti took first place in frequency response, signal-to-noise, and distortion in our audio spec tests. The Rio synth wasn't the judges' favorite, but it fared well nonetheless. Since you can use the Tahiti without the Rio, and since the Tahiti features a MIDI port from which you can drive external MIDI gear, for this review we're only concerned with the Tahiti's performance in the spec tests. After all, Quad Studio is a hard disk recording system, so we're talkin' digital audio here, not playback of General MIDI sequences.

Quad Studio, as its name implies, is a four-track system, but it's important to note that the Tahiti is a stereo soundcard, and, as such, has a single stereo audio output. Although you can play back four independent tracks from Quad, they will be mixed to stereo prior to their final output. You can, however, set up Quad Studio with two Tahiti cards, which would give you two stereo outs, and thus, a discrete audio output channel for each Quad track.

The other half of Quad Studio is the operating software. (If you already own a Tahiti or MultiSound soundcard, you can purchase the Quad software on its own.) As we mentioned above, the paradigm for the interface is the multitrack cassette recorder, chosen both for its familiarity and its ease of use. Turtle Beach has included both "beginner" and "expert" modes of operation, so even those new to multitrack recording (tape- or hard-disk-based) shouldn't be too overwhelmed.

In expert mode, you get a four-track mixer with a volume slider, pan slider, input level LED, input attenuation numeric readout, and mute, solo, and edit buttons for each input channel (more on the edit buttons below).

TURTLE BEACH QUAD STUDIO

DESCRIPTION
Hard disk recording/editing software and hardware.

SYSTEM REQUIREMENTS
IBM-PC or compatible, minimum 486/33 with 4Mb RAM (8Mb recommended), VGA or Super VGA monitor, 16-bit expansion slot, hard disk with minimum 16ms seek time, mouse, and Windows 3.1. Turtle Beach Tahiti or MultiSound soundcard.

FEATURES
Quad Studio: Four tracks of simultaneous digital audio playback. Stereo or mono recording at 11kHz, 22kHz, or 44.1kHz rate with 8-bit or 16-bit resolution. Software-controlled audio mixing with fader, mute, and pan automation. Programmable markers. Automated punch-in/out with programmable pre-roll. Unlimited track bouncing. Control of start and stop, faders (volume and pan), mute, and solo via external MIDI commands. Generates MTC sync (four frame rates) for slaving MIDI sequencers. Wave SE: Graphic waveform editing with cut/copy/paste, reverse, gain change, fade-in/out, EQ, FFT analysis, mute, mix, crossfade, invert, DC offset, and time compression/expansion. Miscellaneous applets: Level metering, MIDI routing, audio playback levels, and system diagnostics.

INTERFACING
Stereo line in, stereo aux in, stereo audio out (all 1/8" TRS). Joystick port for MIDI in/out/thru.

SUGGESTED RETAIL PRICE
Quad Studio with Tahiti soundcard: $499. Software only: $199.

CONTACT
Turtle Beach Systems, 52 Grumbacher Rd., York, PA 17402. (800) 645-5640, (717) 767-0200; fax (717) 767-6033.

The master section includes a volume slider, output level LEDs, transport controls, grouping functions for pan, mute, and volume, a sync on/off switch, programmable markers, loop-in-playback controls, punch-in/out locator displays, and a punch enable button (see Figure 1). In beginner mode, things are stripped down to volume sliders, pan sliders, and level LEDs on the individual channels, and simply a volume slider and LED meter in the master section. The transport controls are still there, but minus the punch-in button (see Figure 2). Both modes feature a large location counter.

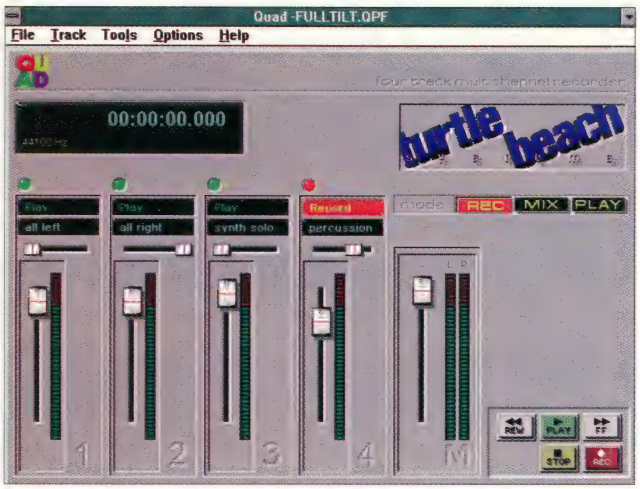

Fig. 2. In Quad's "beginner" mode, the on-screen display — and the underlying functionality — is stripped to the bare basics: volume sliders, meters, and transport controls.

As with any multitrack recording system, Quad allows you to monitor one or more tracks while recording to another. You can also bounce tracks and/or mix them to a stereo .WAV file. Have we mentioned that pan, mute, and volume settings for each track can be automated and the automation moves become part of the bounce down/mix? Now we have. Turtle Beach, never a company afraid of alienating people through the use of bad puns, has seen fit (or unfit, as the case may be) to name their automation functions after those found on the ultra high-end SSL consoles. That's right — it's Turtle Recall.

You can graphically edit tracks using the waveform editor of your choice. Quad Studio comes bundled with Wave SE — Turtle Beach's relatively full-featured waveform editor — so the choice shouldn't be too hard to make. This is where the edit buttons come in: Click on one, and you're automatically switched to the waveform editor. In the version of Wave SE shipped with our review unit (1.1), the wave file of the associated channel is not automatically brought up on-screen when you click the channel's edit button.While this is only a minor inconvenience from an operational standpoint, it does raise the possibility of accidentally editing the wrong wave file, as you could, for example, access the editor from track 3, yet track 2's wave (or the wave of whatever track you last edited) might still be loaded. More recent Quad Studios are shipped with version 1.2 of Wave SE, in which, Turtle Beach reports, this problem has been remedied. Registered owners of Quad systems that came with Wave SE version 1.1 can contact Turtle Beach for a free update.

In case you were wondering, Quad Studio does provide a means for integrating digital audio and MIDI sequencing. It does this by outputting MIDI Time Code (MTC). Assuming your sequencer can respond to MTC (we were using Cakewalk Professional for Windows), it will start playing when you press "play" in Quad Studio. Yes, it will stop, too. Quad also responds to MIDI continuous controller commands, so you can operate the faders, play and stop controls, and so on from a remote MIDI device.

Installation of the Tahiti card, the Quad Studio software, and Wave SE was a snap. Program operation was nearly as fluid, aided in part by the simply written (though not overly thorough) manuals and the on-line help.

Recording. Call us brash, but we decided to go right for expert mode. Since we planned on combining digital audio with MIDI sequencing, we spent a moment in Quad's options menu defining a few basics, such as the frame rate that would be used for the MTC sync and the MIDI channel on which Quad would receive external controller commands. We also set up Cakewalk Pro so that it looked to the Tahiti card for its MIDI input and output.

Next step: We enabled record mode in the master section and in the desired input channel, which in Quadspeak is always a "track." When you enable the track record mode, you're presented with a dialog box in which you enter a file name for the .WAV file that will be created. Press return and you get another dialog box in which you select the record sample rate (11kHz, 22kHz, or 44.1kHz), resolution (8- or 16-bit), and whether the track will be recorded in mono or stereo. (Only one track at a time can be in record mode, but, as just noted, that track can be recorded in stereo.) You're also asked to give the track a name. It would be nice if the name you had just typed in for the .WAV file appeared in the track name dialog field as a default, but that's not the case. We suppose there are reasons why you might want to name the track something different than the .WAV file it contains, though we can't think of them at the moment. But the option is there nonetheless — whether you want it or not.

The file name is never visible, so it's even more important that the track name reflect the name of the file. Otherwise, you never have any way of knowing which of the 17 vocal takes (to cite just one example) is the one you've got currently loaded in the track. Don't try selecting "play" and expect that the file selection dialog will give you a clue; all you'll get in the file name box is "*.wav". Helpful, no?

There's also a large field into which you can enter comments about the track. Oddly, when you access a new .WAV file for the track (either by recording a new one or loading an existing file), the comments are erased. Since its likely that through the course of a project you'll regularly be loading files and bouncing tracks, the comments field seems fairly useless.

Setting proper record levels is simple enough — you watch the channel's LED meter and, as the manual recommends, try to keep the red LEDs from lighting up. You don't, however, need to rely strictly on a visual representation of your level. If the signal is too hot you'll be greeted with intense clipping distortion. As long as you don't hear any unintended nastiness, your levels are likely within acceptable limits.

A level applet that's included with Tahiti can be used to set the overall generic input levels for the system according to the type of signals you're likely to be recording. After that, you can use the individual channels'

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volume sliders to control input attenuation, from 0dB to –96dB. The upshot is that the system can accommodate a variety of signal levels save one: The inputs on the Tahiti card are not designed to handle microphone-level signals. You need to plug the mic into a mic mixer or preamp, then feed that output into Tahiti.

We encountered a bug in which clicking on a track's volume slider caused the input level to jump significantly, after which we had to use fairly dramatic attenuation in order to avoid clipping. Despite this, we had little trouble setting the "proper" record levels for a variety of line-level gear, from synths to CD players.

We say "proper" because while our input levels were, according to the meters and our ears, just below clipping, the files were actually recorded considerably lower than full-code — only about 50% of code, in fact. This means that if you go strictly by the meters, you're not going to get anywhere near the dynamic range that the system's hardware architecture should, in theory, support. Increasing the wave's amplitude after the fact (as an edit in Wave SE) will help with overall system signal-to-noise, but it won't gain you any dynamic range in the track itself. We were able to get better results when we ignored the meters (*i.e.*, we went into the red) and simply listened for clipping. We also got better results when we enabled a track and didn't adjust the volume slider, but rather left it at its –20dB default. We checked with Turtle Beach; they confirm that leaving the faders alone and using the Rec Prep applet for setting levels is the preferred method of working.

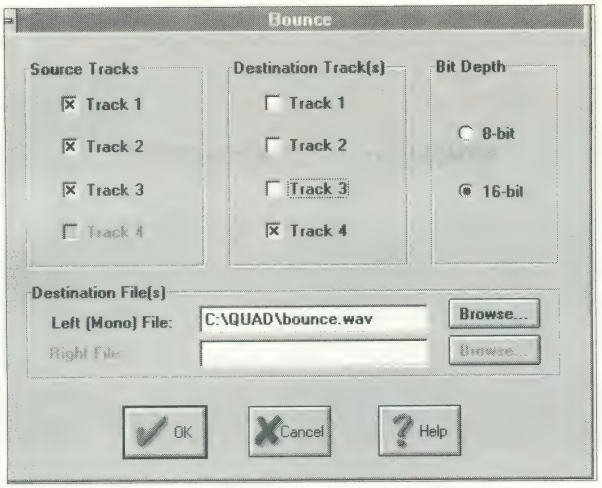

Fig. 3. Quad's track bounce dialog. Tracks can be bounced to mono or stereo, and at either 8- or 16-bit resolution.

As with any multitrack device, stereo signals recorded in Quad occupy two tracks. You only need record-enable a single track, however, which means you don't have to mess with setting independent record levels or pan positions. Once you've completed your recording and opted to keep a given take, Quad splits the file into two independent files (the left and right sides; you can name them as desired) and assigns them to two tracks. Handily, the program informs you what file has been assigned to which track — especially nice when adjacent tracks aren't available. If two empty tracks aren't available, you're asked to close a track to make room before the stereo file can be loaded or recorded.

When it came to straight-ahead recording, Quad performed flawlessly — no hiccups, glitches, or unpleasantries in the audio. The only real hitch was the lower-than-optimum code levels at which files tended to be recorded. Punch-in recording was also glitch-free with regards to punch smoothness, and the programmable pre-roll is a nice touch. We did, however, run into a significant operational snag and a fairly major bug. The snag: For some reason, Quad doesn't transmit MTC when in punch mode. If you aren't using a

sequencer in conjunction with Quad, you'll never notice this oversight. If you are using a sequencer, you'll likely find this a serious omission. As for the bug: We tried punching in on a stereo file. We knew, of course, that Quad splits stereo files into two independent mono tracks, so we only expected one of the tracks to be recorded. That, in fact, was what happened. What we didn't expect was the totally garbled audio that was recorded during the punch. Turns out the same garbling happens with mono files if the punched file is open in more than one track. Turtle Beach is aware of the problem and working on a fix.

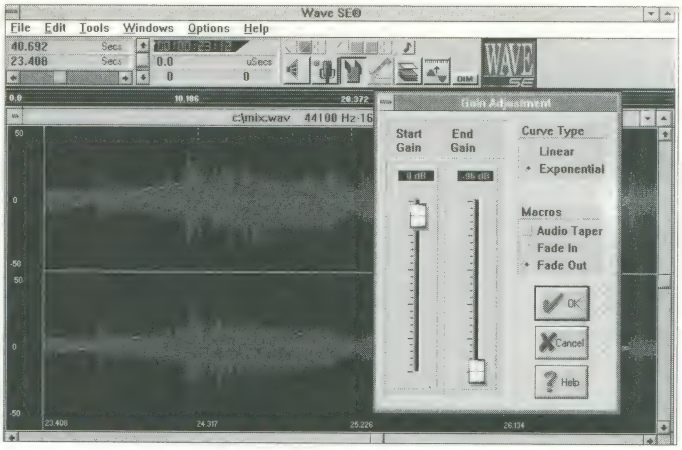

Fig. 4. Graphic waveform editing is provided courtesy of Wave SE, which comes bundled with Quad. In this example, the fadeout macro of the gain change utility is being used to create the final fade of a stereo mix.

Mix Automation. We were, at first, astonished to find any type of automated mixing on a recording package with Quad's price point. And while Turtle Recall is no match for SSL's Total Recall, there's still good reason to be astonished: The automation provides control over volume, pan, and mute functions. You simply perform the desired moves — tweak a fader, mute a track, etc. — and your movements are forever recorded for posterity. Whatever moves you make are applied when you bounce tracks as well, so it's easy to seamlessly combine several takes of, say, a guitar track, into one — complete with crossfades and panning (see Figure 3).

Using the "mix to file" option, you can automate the mixing of up to all four tracks and save the results as a stereo file. This file could be your final master mix, or you could load it into two tracks and continue recording additional parts on the other two tracks, building an elaborate composition by repeating the process *ad infinitum* (we did just that — see below). Naturally, since the mixing is done in the digital domain, you don't get the buildup of hiss and loss of quality normally associated with bouncing tape tracks. You do, of course, lose control over the individual elements in a mixed file once the mix has been executed.

There are a couple of downsides in all of this wonderfulness. First, the automation of the master slider is somewhat buggy and unpredictable. We think you're better off performing fades in Wave SE (see Figure 4). Second, and far more important, mix moves, for all intents and purposes, can't be updated. You can record over them, to be sure, but the newly-recorded data doesn't overwrite the old data — the new data is simply added to the old. So let's say you had a volume fade on a track and decided it occurred too quickly. You re-record the fade a bit more slowly, assuming that the fade will be updated. What you'll get, in fact, is the two fades together, with the volume slider madly jumping from position to position as it tries to keep up with playing two different, simultaneous fadeouts. The results

may be visually amusing, but sonically they're highly undesirable.

You may be thinking, "So what? I'll simply erase the first take before recording the second one." Good idea, O veteran of a zillion overdubs. Unfortunately, the only way to erase automation data is to erase *all* of the data. So if you've performed moves successfully on three tracks and then blow it on track four, you're up the creek without a MIDI cable (or some such metaphor). You can choose not to keep your latest take, but that's about all the flexibility provided. In other words, once you're committed, you're either committed for good or you must choose to lose it all.

Editing. Editing? What do you mean, *editing*? Do you get editing on a $499 multitrack cassette deck? How about on one that goes for $1,799? No and no. But you *do* get editing in Quad Studio, courtesy of your favorite graphic waveform editing software.

Bundled with Quad is just such a program, Wave SE, sister to Wave for Windows, one of the premier graphic waveform editing packages for the PC. Wave SE offers a somewhat different, though not necessarily less capable, feature set than its near-twin. The program includes essentials like cut/copy/paste, reverse, fade-in/out, gain-adjust, and mix. It also offers higher-end tweaks such as EQ and time-compression/expansion. In short, Wave SE provides a tool set appropriate for all but the most demanding applications.

Not that we wouldn't like more. Given the record level problem outlined earlier, we think a gain-normalization function is essential when using Quad (you can normalize the file only by figuring out the proper gain adjustment for yourself — which may take a few tries). From the aesthetic side, we'd also like to see some effects algorithms — delays, flanges, etc. You'll be happy to know that all of these things — and more — are available in Wave for Windows.

About the only thing you're likely to find problematic is editing Quad "stereo" files, because Quad stereo files are actually two independent — and thus essentially unrelated — mono files. As such, if you want to cut a glitch out of, say, a stereo drum track, you'll have to perform the edit on two files (go ahead, we dare ya). Our suggestion: Prior to editing, use the "mix to file" option to blend the two tracks into a true stereo .WAV file. It takes a bit longer to do this extra step, but it's time well spent.

Practical Tests & Subjective Impressions. Okay, already. We've seen that Quad Studio offers a considerably more flexible feature set than the multitrack cassette format it mimics. We've mentioned that the Tahiti garnered three first-place awards in our soundcard roundup audio specification tests. But we're talkin' real music-making here, not computer games and audio test equipment. How does Quad Studio sound?

In a word: pretty darn good. (Yeah, yeah. That's three words.) Two tracks sound as clean as you'd expect. Three, still pretty clean. Four — you're starting to lose a bit of clarity, but the sound quality is still very listenable.

We wanted to push things beyond Quad's four dedicated tracks, so we took a stereo drum track and combined it with our bass track, resulting in a stereo drum/bass track. We then recorded our synth pad in stereo and mixed it with the drum/bass tracks, resulting in a stereo drum/bass/ synth track. (By the way, mixing down is an off-line process, and takes a bit of time. We suggest having a snack tray and some cold drinks handy.) This combo track sounded essentially the same as the pre-mix multitrack version. We then recorded a lead line and assigned it to two tracks, which we panned to opposite sides of the stereo image. We then offset the playback of the second track by a few milliseconds, which resulted in a widespread lead

playing over the top of our mix. Very impressive-sounding, indeed.

The more clever of you may have noticed our casual reference to a track offset, one of Quad's hipper features. You can offset a track by virtually any amount, with 1ms resolution. This allows you to perform tricks like tightening up a track that had been flown in without sync, adding echo and delay, or splitting a lead line, as we did above.

One thing to watch out for: Tracks whose record start is a point other than "0" (as referenced by the start of the very first file recorded) have an offset that corresponds to their record start time. If you load another file into that track, it too uses this non-zero offset, which will, in all likelihood, need to be reset. Conversely, if you bring the offset file into a new track, you must enter the appropriate offset or the track won't play at the proper time. In other words, keep a pencil and paper handy.

Conclusions. Think multitrack hard disk recording is the exclusive domain of the powerful, the professional, and the monied? Think again. Quad Studio brings serious, capable, high-quality hard disk audio recording to the computer-based masses at a price point that's likely to send chills down the spines of the Turtle's competitors. Turtle Beach used to be the high-priced guys in a field dominated by low-priced products — products that more than satisfied the customers for whom they were intended. Now the Turtles are the (ridiculously) low-priced guys in a field dominated by high-priced products — products that are either too high-end or too pricey to meet the needs of the everyday consumer.

Just what are those needs? According to most everyone we talk to, people want high-quality multitrack audio in an easy-to-use, easy-to-understand, and easy-to-afford format. Quad Studio meets all four criteria. Its audio fidelity, while not a match for serious high-end pro systems, should be more than adequate for semi-pros, songwriters, multimedia developers, home hobbyists, and the like. Unless your current project is mastering the next Sting CD, you should be pretty happy with the sound quality offered by the Tahiti card. Need a point of reference? At its worst, Quad Studio can deliver far better fidelity than a high-end cassette-based multitrack system. Speaking of which. . . .

Having the Portastudio metaphor at the heart of its interface automatically puts Quad within the reach of thousands upon thousands of users — at least from an operational standpoint. Save for a couple of extra mouse clicks here and there and the semi-annoying file/track naming conventions (or lack of them, to be more specific), nothing about Quad's basic operation should confound the average user. The system is about as straight-up as they come, making it ideal for anyone who needs to get their ideas realized quickly.

Despite its simplicity, you do get some pretty trick items, such as fader, mute, and pan automation, integration with MIDI sequencers via MTC, MIDI control of Quad functions, and unlimited track bouncing — the latter without introducing audio degradation, such as hiss and high-frequency loss. Of course, you don't get some of the niceties — non-destructive playlist editing and editable automation, to name an important few — found on some of the more pro-oriented systems. And the Turtles are still shaking out a few bugs (as of this writing, Quad was only in version 1.0). But frankly, we're blown away by just how much the system *can* do.

Real digital recording for real people was bound to come along sooner or later. Given their reputation and track record, it's only fitting that Turtle Beach is the one to deliver the goods. Affordable multitrack hard disk recording? Just look in the dictionary under Quad Studio. ■

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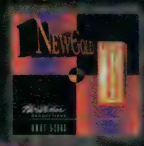

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Having set the standard for entirely new types of synthesis with last year's VL1 (see Keyboard Report, June '94), Yamaha has now turned their attention once more to straight-ahead sample playback synthesis. While leaving the tone generator alone, they've ambitiously set out to reinvent everything else that goes into the instrument. Their W7 bundles a familiar set of components — synth tone generator, effects processors, sequencer, and disk drive — in a single chassis, and also adds some significant new wrinkles for the '90s. They seem to be trying to rethink the concept of the workstation in a way that makes sense for somebody who is just getting into electronic music, or whose production needs are bigger than their budget. The W7 has some limitations, as we'll see, but these will likely be noticed mainly by the expert. For both newcomers and home studio owners, it provides a very attractive combination of features at an excellent price.

At least, the price is attractive if you go for the 61-key W7. The 76-key W5 is identical except for the extended keyboard, yet it retails for $500 more. We'll leave it up to musicians to decide whether the extra range is worth the extra bucks.

Overview. The synthesis engine in the W7 is very similar to what we've seen on several earlier Yamaha instruments, notably the TG500 and SY85. Up to four independent oscillators can be programmed per patch. There are 32 total voices of polyphony; as with any other synth, you'll have only eight-note polyphony with patches that are sounding four oscillators at once.

The waveform set has been revamped somewhat from earlier instruments; 8Mb is enough memory to provide all of the usual sounds, but above and beyond this, Yamaha is going to be offering a series of plug-in internal wave boards. The first one to be released is a 4Mb piano. The optional waveform RAM found in the SY85 has been eliminated, however.

The 16-track sequencer is a perfectly reasonable tool for a workstation-type instrument. Its clock resolution is 96 ppq (the minimum standard for decent-sounding music). The editing utilities are quite good, and each track can drive internal sounds, external MIDI modules, or both.

One of the best things about the W7 is its effects setup. A total of six effects processors are available in the instrument; three are considered global to a sequence, and each sequence track has its own effect send controls. The other three are assigned to individual tracks in a sequence (one per track). This provides a lot of musical flexibility for those who want to use the W7 as their main or only sound source. It's less desirable for those who have a lot of gear, as we'll see.

The big news in the W7 is its fairly exhaustive set of patch programming templates. With these, the novice programmer can create great new sounds with almost no hassle. The template system has some limitations that may not please the veteran programmer, but for most of the people who are likely to buy and use the W7, it's a terrific convenience, inviting you to discover the wonders of electronic sound and make better music.

The factory presets on the W7 are just plain terrific. While the 4Mb piano expansion board is stunning, even the normal acoustic piano is quite respectable. We liked the organs as well, and the detailed new age pads. The acoustic guitars are fairly convincing, and distortion makes the electric lead guitars truly fierce. The basses are solid, the strings lush, and the analog synths fat. The trumpets are not as brassy as we'd prefer — a bit on the tweezy side, in fact. The flute is lovely, but the recorder is a joke. The crash and ride cymbals are too short, and the snares could use more snap, but they're solid and should work well in a mix.

The user interface is well laid out, with lots of buttons and a minimum of submenus. Sixteen backlit track buttons show which tracks have data recorded onto them; in voice edit mode, these buttons become the element se-

lect/mute switches, and also provide instant access to the eight different edit pages. In sequencer mode, the large LCD makes use of the mixer metaphor first seen on the TG300 (see Keyboard Report, July '94), with an array of tiny send "knobs" and level "sliders." In most modes, the eight soft buttons below the LCD provide access to related functions. Keep an eye on these, because certain soft-button menu tags only appear when you're on a given page. While a few ergonomic issues did surface in the course of our research, we'll give the W7 a solid B+ in the friendliness department.

A powerhouse production package for the smaller studio: Yamaha's new W7/W5. The W5 (shown above) has a 76-note synth-action keyboard.

Sequencer. While the W7's sequencer is undeniably less powerful than the average computer sequencer, it provides just about all of the functions that the average player is likely to need from day to day. We spotted only a couple of limitations that we would regard as potentially serious in certain specialized musical situations.

The sequencer can access up to 16 separate songs, each with its own "header" information — selected programs, effects and effect send levels, and so on. In addition, each song can contain its own bank of 128 sound programs. If you've ever tried to make a new set by loading songs from different disks that each required a different bank of voices, you'll appreciate just how slick the W7's voice bank setup is. It's not without limitations (see below), but it solves a big problem in an elegant way.

Each of the 16 tracks can be assigned to an internal program, to MIDI transmission, or both. The disk drive can load type 0 and type 1 Standard MIDI Files using the MS-DOS disk format, and can save to MS-DOS using type 0 files, which means you can easily transfer 16-track sequences to a computer if required, or purchase disks containing tunes and load them. Track naming is not supported, nor are multi-channel tracks. The disk drive also reads and writes in a format compatible with earlier Yamaha sequencers.

The sequencer offers programmed tempo changes and punch-in recording with pre-roll, both of which are very important features. Recording can be done in replace or overdub mode. Recorded tracks can be muted or unmuted in any combination. There's a menu of edit commands such as quantize, controller thin, velocity shift, time shift, and so on. There's also an event edit screen, for microscopic edits. Block copy and insert utilities are provided.

Chaining from one song to the next is supported, but the linkage is not seamless; you'll hear a slight hiccup. Also of concern: Notes can't be sustained over the junction point between songs. If you develop the verse as Song 1 and the chorus as Song 2, you'll want to use the "append song" command to put the verse and chorus together in a single memory location. A single "song" (which could be simply a four-bar phrase) can be looped, again with a slight hiccup, but unfortunately the sequencer won't loop while recording, so you can't develop a riff while looping.

Among the cool features are two instant locate buttons and a unique shuttle wheel. The former can be programmed on the fly; once a location is set, each time you hit the locate button, playback will jump without pause to the downbeat of whatever bar you've chosen. Most people will use these points simply for locating to the bridge while developing an arrangement, but their real-time responsiveness lends itself quite well to stuttering playback effects that you probably thought could only be gotten out of a sampler.

The shuttle wheel will produce even more avant-garde sounds. Crank it to the right, and the tempo speeds up. Crank it to the left, and the music will start playing backwards. (Unlike tape playback, of course, the notes themselves will still be playing forward.) The wheel is position-sensitive, and with a little practice you can isolate a couple of bars of a break and slide back and forth through the music in a spastic scratcher style that's tons of fun. The results can't be recorded into the W7 itself, but you can't have everything.

Editing • Region edits in the W7 are always to bar-line boundaries. For many types of operations this is not a problem, but it's hard to imagine that a velocity-taper crescendo should always end on a bar line. We prefer a design that allows regions to be defined down to the bar/beat/clock level, as on several competing workstation sequencers.

The region editing commands include not only the expected options, but some extras. You can extract individual types of data (including notes of specified pitches) from one track to another. Individual note pitches can also be transposed within a track — ideal for drum remapping. Note gate time (*i.e.*, duration) can be adjusted up or down, either by a percentage or by a fixed value; velocity likewise. Velocity tapering for crescendos and diminuendos is supported. Regions can be erased, and new measures can be inserted into all tracks at once, starting at any bar line and in any time signature. You can also time-shift a region (or a whole track) forward or backward by increments as small as a single clock tick. There's even an undo command (with redo) for the most recent edit.

You can copy a track from one song to another, which is very helpful; the songs don't even have to have identical time signature maps (a limitation on some more primitive built-in sequencers). Copying data from one track to another within the same song is performed using the "extract" and "mix" commands.

Quantization allows for swing, and the swing can be applied to velocities and durations as well as rhythm, which is a nice effect, especially since the velocity swing can be negative (with offbeats getting the accents). Percentage quantization (moving notes part of the way from their recorded position to the nearest beat) is not supported, however.

Room for Improvement • The biggest hole in the sequencer's feature lineup is that when playback is started in the middle of a tune, it won't "chase" program and volume changes that are embedded earlier in a track. As long as your tunes are structured in a simple, straightforward way, you may never miss this feature — but for musicians with small rigs, the ability to get the most out of an external tone module by sending it program changes for the different sections of a tune is a vital part of sequencing, and the fact that the W7 will switch programs correctly only when you start playback from the top of the tune makes the process of developing an arrangement significantly harder. Some people would call it a teeth-grinding exercise in patience.

The sequencer's metronome is a pitched beep, which is really bogus. It can't be assigned to a drum kit note. Of course, you can always use up one track creating your own click. Except for punch-ins, recording always begins with a two-bar lead-in; if you only need one bar, too bad.

The sequencer's header information (called a multi) has no voice reserve parameter. With up to 32-voice polyphony — using "voice" here in the commonly accepted sense of an oscillator/filter signal path, *not* referring to

Yamaha patches as voices — many users will find that they're never bothered by voice-stealing, even in busy arrangements. If you should prefer heavily layered patches to stripped-down one-oscillator GM sounds, though, or if you should happen to want to write a tune that has a droning bell sound with a long envelope release underneath some busy percussion, you may hear certain notes getting chopped off abruptly. A voice reserve parameter would have allowed musicians to make their own decisions about which parts needed higher priority.

Voice Programming. If you're still relatively new to synthesizers but you'd like to try creating some sounds of your own, the W7 could be a fine instrument on which to learn about synthesis. It makes the process of designing new patches that actually sound good easier than ever before. This is done via a comprehensive set of templates: Dial up a template for each of three or four basic building blocks, and you may be ready to press the store button. We found the programming system amazingly quick and convenient, for the most part.

If you're an old hand at programming, however, the W7's "convenience" features may become a source of frustration at times, because some important parameters are not visible to the user at all. (Just before press time we received an advance copy of a computer program that addresses many of the issues that arise out of this fact. See the sidebar on page 91 for more.) To get close to the sound that you want, you must choose a template that provides the correct settings. What's worse, the actual contents of the templates are not documented. The owner's manual provides a full list of templates, but the list includes no explanations. Yamaha has provided templates and offsets before — in the TG500, for example (see Keyboard Report, Aug. '93). The W7 has a lot more of them.

The W7 is a straight sample-playback synth, with no extra synthesis features *per se*. Each patch can have up to four "elements," each consisting of a waveform, resonant multimode filter, three standard envelopes, and LFO. The element parameters also include pan, volume, velocity and key limits, and so on.

Templates are available for the filter (including its envelope), the LFO, the amplitude envelope, and the pitch envelope. In addition, each element has a master template containing all of the above. If you've selected no template for a given section, the settings in the master template will be used for that section. If you like, you can mix and match: You can use the master template's settings for everything except the amplitude envelope, for instance, and dial up a different template for this envelope. There are dozens of templates in each section, so even if you don't want to get grease under your fingernails tweezing individual parameters, there are still millions of ways to program an element.

YAMAHA W7

PROS
Many templates for quick creation of new sounds. Six discrete effects processors available in multi-track mix. Song memory includes dedicated banks of voices. Real-time editing of patches while recording.

CONS
Patches are not completely programmable unless you own a computer. Song storage of patch banks is a dead end. Sequencer doesn't chase program and volume changes.

BOTTOM LINE
User-friendly, sounds great. Especially recommended for musicians with small studios and limited budgets.

The W7 provides no utility command for copying a user-programmed element from one voice to another. The assumption seems to be that most users will be satisfied to use the templates without much alteration, and will thus be able to copy an entire sound by scribbling down six or eight settings.

When it comes to actually editing the filter, envelope, and LFO parameters, Yamaha chose to borrow a page from consumer-oriented instruments. Rather than let you edit a parameter (say, filter envelope attack time) as a pure numerical value, they provide *offsets* for the settings in the preset templates. Here's how it works. First you choose a template for the filter; this template comprises a full set of parameter settings for filter mode (usually lowpass, but bandpass, notch, and highpass are available), cutoff frequency, resonance, velocity response, and the envelope. Then you offset the values stored in the template by dialing up a value between (usually) –63 and +63.

For most purposes, this system works very well. If you want to make the sound a bit brighter, you can safely crank up the filter cutoff offset by a few notches — and if you want to get back to where you started, it's easy, because where you started is always zero (no offset). The weenie is, you never get to see the original value stored in the template. An offset of, say, –20 may produce a very different sound when applied to one template as opposed to another. There is no way to compare one template with another, other than by ear. (The names provide some cryptic guidance.)

When you choose a new template, the offsets are not zeroed. This may or may not be preferable in a given situation, but the result is that in the process of programming you may find yourself having to manually zero out the offsets from time to time. Forget to zero one out, and the template won't sound the way it was designed to.

Still more problematical for the seasoned programmer, many standard parameters are not visible to the user at all, not even as offsets. Velocity to envelope speed? Keyboard tracking by the filter cutoff or envelope times? Velocity to LFO speed? LFO waveshape, even? All of these options are definitely present in the machine, but the only way to get at them is to select the proper template. In the absence of any explanation of the templates in the manual, it's up to users to figure out what they're doing. Again, we have to emphasize that this limitation is not likely to be a big stumbling block for the typical musician who only wants to knock together a few killer patches. It's mainly a problem for maniacs like us, who have this eccentric desire to know what's actually going on.

The Templates & Parameters Up Close • To begin with, the W7 ships with 501 element templates. You select these just as if they were waveforms; they have names like "EP18," "Clav6," "Marimba," "SynBrs12," and so on — the usual complement of raw materials. As explained above, however, these are not raw waveforms. Each template references both a waveform and a full palette of parameter settings. In some cases, a number of templates share a single multisampled waveform. You'll hear a bass guitar wave, for example, with a sharper attack (created by a filter envelope), in a more muted form (lower filter cutoff), and so on.

In general, the variations that were programmed at the factory are quite useful. Some of them differ radically, even when the same waveform was used as a starting point; in other cases the difference is so subtle that you may have to listen close to spot a longer amplitude envelope release or a quicker filter envelope decay. We couldn't hear the slightest difference between the three nylon-string guitar templates when we played single notes; it was only when we played a musical passage that the difference in brightness became apparent.

Because of the way the element templates are organized, it's not possible for us to state just how many multisampled waveforms are contained in the instrument. It's a good full set, that's for sure. We did notice that a few of the single-cycle waveforms in the second bank (17, 18, and 19) are tuned quite flat in the bottom octave.

Amplitude • In the amplitude area, the user gets control over the loudness of the element, the velocity response (±14), and four segments of the envelope — attack (or hold), decay 1, decay 2, and release. When the velocity response is given a negative offset, the element

will fade out as you play louder, suitable for velocity crossfades.

Note that the user has no control over envelope sustain level — a fairly boggling omission for those of us who are fixated on traditional concepts in envelope design. In order to program a W7 patch to hit hard, subside to a low level, and stay there without fading out, you must either find a template that does what you want, or else use at least two elements, one for the attack and another for the sustain. The envelope can be set to infinite sustain by setting the decay 2 offset to a high enough negative value, but this sustain will most likely be at full amplitude. In addition, the envelope templates often have a low-level breakpoint between decay 1 and decay 2, to create a double-struck effect. The level of this is not user-addressable. If the factory setting doesn't suit you, you have to choose a different template.

Amplitude templates include a variety of struck/plucked envelopes (including some with keyboard scaling), sforzando-piano swells, slow pads, and a double-struck attack. In one case, two similar sustained envelope templates differ mainly in the way velocity is routed to attack time. Velocity response curves (your choice of eight items) are selected at the global level, not in individual patches.

Filter • Resonant multimode filters are a great resource, especially when you can program a different one for each of four elements and have them sweep through the tone at different rates. The W7's filters can self-oscillate, which is again a potent resource for certain classic synth sounds.

The filter templates incorporate all of the filter parameters, not only the envelope but also cutoff and so forth. Among the templates you'll find items suitable for techno bass, orchestral winds, swirling notch effects, harpsichord release clicks, heavy velocity response, and so on. Several provide cutoff tracking of the keyboard.

The filter envelope is functionally identical to the amplitude one. The absence of level controls is more problematical here, because the envelope is, in effect, always full-on with respect to its effect on the filter cutoff. Envelope amount is not a user-adjustable parameter.

With the lowpass filter templates, the available offsets are cutoff frequency, resonance amount, and velocity response — a serviceable set of parameters. The highpass filter has no resonance. Nor does the bandpass, but it does have two user offsets, one for bandwidth and the other for velocity modulation of bandwidth.

As on many earlier Yamaha synths, the W7 filter can be modulated by either an envelope or the LFO, but not both within a single element. This is a musical issue, and also an issue when you turn to LFO programming, because if an envelope-type filter template has been selected, the FMD (filter modulation depth) parameter on the LFO page will have no effect.

LFO • The LFO templates include some items that respond strictly to the mod wheel, and others that will always produce vibrato or tremolo. The usual waveforms (sine, triangle, square, saw up and down, and sample-and-hold) are provided. Some templates provide a preset amount of velocity modulation of LFO speed. (LFO speed can also be driven by a real-time controller.) Templates for filter and amplitude modulation are also available. The instrument offers no LFO control over panning of individual voices, only a panning algorithm in the effects processor.

The user offsets in the LFO are for modulation depth of the pitch, filter, and amplitude, and for LFO speed and delay time. LFO modulation of filter and amplitude tends to have a slightly grainy quality, which is fairly typical of digital synthesizers in this price range.

Real-Time Control • Each W7 voice allows for user-defined real-time control over a number of parameters from two continuous MIDI controllers of your choice. Normally, one of the latter will be the front-panel control slider, which can be assigned to transmit (internally and via MIDI) any continuous controller between 1 and 119. Assignments for the mod wheel, aftertouch, and a footpedal are more restricted. Pitch-bend depth and aftertouch-to-pitch-bend are programmable, but the pitch-bend wheel can't be redefined to send other messages. Each of the four elements can be switched on or off for reception of each of the above data types (and also for reception of sustain pedal data), which makes it possible to set up some very esoteric musical effects.

Modulation destinations for the two assignable control inputs include individual envelope segments, filter cutoff and resonance, panning, and several LFO parameters. The minimum and maximum control values can be programmed (or inverted), and again, the reception of this control can be switched on or off for each element. While only one destination is selectable for each controller, the W7 still boasts plenty of real-time control — more than most musicians will ever use.

Its ability to sweep the filter from the mod wheel or expression pedal is hobbled, however. When the filter is set up to accept input from its envelope (and remember, you have to choose whether you want input from the envelope or the LFO; you can't have both), continuous controller input is read by the filter in a momentary fashion at the start of each note and then ignored until the filter envelope reaches its sustain segment — which could easily be two or three seconds after the start of the note. Once the sustain segment is reached, the filter starts responding to controller input in a continuous fashion, but during the first part of the note, the filter cutoff can only be swept automatically by the envelope. If you should start your manual sweep a little too early, you'll hear a nasty, unmusical jump in the filter cutoff when the sustain segment is reached and the filter starts to respond to the sweep input. If you want to sweep the filter cutoff continuously in real time, wah-wah fashion, you must choose a filter template for which the filter is assigned LFO input.

Pitch Control • Yamaha has lately adopted a simplified version of Roland's hallowed pitch tracking parameter. Each element can track the keyboard normally (100 cents per key), at 50 cents per key, at 20 cents, at 10 cents, at 5 cents, or not at all. No stretch tuning, unfortunately. For quick percussive attack transients, this capability is quite helpful. A slight amount of random detuning per keystroke is also supported — again, useful for emulating certain types of acoustic timbres.

Forty pitch envelope templates are provided, including such options as attack glides and blips, release shift upward, brass fall, velocity-responsive fixed pitch, and even a repeating envelope that can be used for vibrato. Pitch envelope depth is programmable from –200% to 200%, which means that the absence of level control over individual envelope segments is less of a problem here than in the filter, where the envelope is always full-on.

Drum Kit Programming • For musicians

SOFTWARE SUPPORT

While W7 voices are not 100% user-programmable from the front panel, Yamaha is supporting the instrument with editor/librarian software that is available for free. Their assumption seems to be that most of the power users who want to get in and fine-tune things like envelope levels will have access to a computer. Makes sense to us. The software is further evidence that Yamaha is devoting a lot of thought to the best ways to meet musicians' needs.

The Macintosh version of the editor/librarian arrived in our offices mere hours before deadline, too late for us to test it; the Windows version should be shipping by the time you read this.

We confirmed that the missing voice parameters are indeed addressed by the software, and that parameters are shown as absolute values rather than offsets. If you have access to a Mac or PC, most of the voice-editing limitations of the stand-alone W7 will cease to be of concern.

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SOUND SOURCE INTERACTIVE

who need to use the W7 as their main sound source in full pop arrangements, the drum kit programming will probably be very adequate. You can assign a sound to each key within a kit — up to 69 keys. Each key/sound can then be tuned (in fine increments over a ten-octave range), panned, and given settings for volume, reverse sample playback, gate time (up to 2,600ms), and decay (0-31). Oddly, the decay time parameter shortens the sound as you raise the value; decays above 20 sound like paper-clip percussion.

Like other programs, the drum kits each contain an insert effect. You can also program the level of each individual drum key that will be sent to the system effects, but this setting will only be applied to the sound if the insert effect is switched off — which makes sense, because the insert effect only has one stereo output. If all of the drums are being routed through it, they can't be separated afterward and sent to different system effects at different levels. If you need to use an insert effect on a single drum, say for a gated snare, you're better advised to program the snare as a normal voice — which also allows you to do tricks like velocity cross-switching — and sequence it on a different track.

We can't help wishing that each drum key had its own filter cutoff and resonance settings. If you need filtered drums, or high-end features like attack time control, velocity amount to pitch, or the ability to layer two drums on a single key, you'll just have to program your percussion as normal voices and devote more sequencer tracks to percussion.

Effects. In some ways the W7 goes further than any previous synthesizer when it comes to providing effects processors. The instrument is capable of producing up to six discrete effects at a time — and some of these can be dual-effect algorithms, so the actual number of simultaneous effects is even higher. If you plan to create full "studio-quality" arrangements within a single instrument, you'll be delighted with the W7. It can add distortion to a guitar line, phasing to a Clavinet, and delayed echoes to a flute at the same time while *still* providing reverb, chorus, and who knows what else for up to 16 tracks at once.

If you've already got some other synths, and plan to use the W7 mainly to play one sound at a time in a MIDI mix, you'll be less thrilled by its effects setup. True, you can process a single patch with up to four effects — but you can't store all four of them in memory with the patch. Three of the effects processors are considered global effects for applying to the multichannel mix, and their settings are stored to the 16 song multis rather than to individual patch memory locations. Also, with a four-oscillator patch you might like to juggle the send amounts of the various oscillators, or even route each oscillator through a different effect. You can get the same musical result in the W7, but only with the aid of a cumbersome workaround involving four different single-oscillator patches assigned to four different tracks.

Each channel of the multi has its own send level controls for the three global effects, so you can assign just reverb to some tracks, reverb and chorusing to others, and so on. Each effect processor also has its own master return level control. Rather than using the send pot, you can select a "voice" setting for the send; this causes the effect to receive whatever signal level is programmed into the patch for that send. If you tend to use the song effects for specific purposes, this is a neat way of insuring that, for example, the electric piano always comes up with the proper amount of chorusing, no matter what track you happen to assign it to.

The other three effects are "insert" effects. Each patch is programmed with its own insert effect, and in a given mix you can switch on the insert effect for up to three tracks. This is a great system. It gives you the flexibility to apply special effects to the most important musical parts in a mix, and also to control

the overall ambience. By switching the insert effect on and off for different tracks, you can try out different combinations of effects with the greatest of ease.

What It's Got • The first processor has 11 different reverb algorithms and four delays. Delay times can be set down to the .1ms level, which is even higher resolution than you really need for syncing the delay precisely to the beat. The reverbs can sound fairly lush and warm, and at the other extreme are capable of some strikingly metallic resonant comb filter effects. (Check out the tunnel algorithm, which has parameters for height, width, depth, and wall variance.)

The nine algorithms in the second processor are dedicated to chorus-type processing. You've got chorus, flange, phaser, auto-pan, rotary speaker, wah-wah, aural exciter, and stereo pitch-shift. They all sound good to us, adding a lot to the richness of the W7's sound. The parameters are basic — modulation depth, speed, and feedback, usually. Many algorithms also include EQ. The pitch-shift has a theoretical ability to alter the pitch of the signal by up to two octaves up or down, but beyond two or three half-steps it doesn't perform the way you might expect; consider it useful mainly for spectacular gargling effects.

The third processor provides 16 choices — four reverbs, four delays, four specialized reverbs (early reflection, gate, and reverse), and four dual effects (EQ or distortion with reverb or delay).

Thirty-five algorithms are available in the insert effects, including most of the types just discussed. The eight reverb types are the same as in the third song effect processor, as are the four delay types. There's an extra flanger, and an extra pitch changer. The insert effect mix can be adjusted to be 100% wet if desired, which is fortunate, because the song effect sends can't be switched to pre-fader; thus the song effects are always at least 50% dry. (This is not a big problem with the possible exception of the panning effect, which really ought to be applied to 100% of the signal.)

You'll find some unusual and musically useful options among the insert effects. The panning effect includes both a left-right and a front-back depth; the latter is a sort of doppler pitch-shift that adds a real feeling of depth. All ten of the dual algorithms involve distortion, which is natural if you consider that adding distortion to a lead guitar line is one of the more important effects that you'd want to apply to only one track in a mix.

Numerical keypad data entry doesn't work for most effect parameters, which is a bummer. The values for items like delay time have a wide range, but you can't type in, say, "650 <ENTER>". Unless you enjoy spinning the data entry dial literally a couple of hundred times, the optimum method is to hold down the INC or DEC button; after a few seconds, the rate of data scrolling will speed up dramatically.

Each insert effect has one real-time control input, which can be used to change the value of any parameter. Real-time control of the song-level effects is limited to the send level for each track. It's great to be able to control things like flanger feedback and rotary speaker speed from a sweep pedal. While you could also assign a two-position switch as the rotary speed input, there will be no programmed speed-up or slow-down time when the pedal is pressed or released. Because the real-time input adjusts parameters, and the parameter values are by definition stepped, foot control of the wah (swept filter) effect is very audibly staircased, not smooth. The auto-wah, created by an envelope follower, flows up and down smoothly, but if you want smooth real-time wah-wah, the recommended method is to sweep the voice filter cutoff instead of using the wah effect.

Remembering & Forgetting. As you might expect of a full-function, software-driven musical instrument, some of the internal

Continued on page 124 ►

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SUPREME BEATS A PERCUSSION LIBRARY BY BASHIRI JOHNSON

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BANG FOR THE BUCK	

Format: Audio, plus Akai, E-mu EIII, Ensoniq, Kurzweil K2000, Roland, and SampleCell CD-ROM.
Overview: Contemporary, dance/hip-hop, African, and world percussion loops, construction kits, and single hits.
Contents: Four audio CDs. 650 loops. 100 single-instrument samples. Loop categories include Mozambique, Charleston, cha-cha, hip-hop, scratch, tribal vocal, industrial dance, soukous, African, samba, Hawaiian, solo patterns, and more. Single instrument samples include bamboo tube, bell, bongo, bottle, clave, conga, dumbek, frame drum, gong, log drum, quika, shaker, spoons, tabla, talking drum, triangle, wood block, and so on.

Suggested Retail Price: $299 for four-disc audio set. $199 per CD-ROM, due out in Feb. '95 (two CD-ROMs will be released; one contains material from audio discs one and three, the other from discs two and four. Both will feature additional unreleased material).
Contact: Grand Street Records & Filmworks, distributed by Spectrasonics, Box 7336, Burbank, CA 91510. (818) 955-8481, orders (800) 764-9379. Fax (818) 955-8613.

From tribal stomps to contemporary dance spices, *Supreme Beats* is just that: supreme. With four CDs and a gorgeous 51-page booklet, this is one of the most exhaustive and impressive percussion packages we've seen.

And it sounds even better than it looks.

Bashiri Johnson (whose past employers include Madonna, Whitney Houston, Donald Fagen, and C+C Music Factory) plays his butt off on these discs. Nothing fake about these grooves; it's a feast of human feel, energy, and emotion. 650 stereo loops and 100 single hits are spread across four CDs, featuring Johnson and an all-star supporting cast of Cyro Baptista, Luis Conte, Kimati Dinizulu, Daoud Woods, and others. If you're looking for standard drum kit loops, though, or samples of kicks, snares, toms, and cymbals, you're barking up the wrong tree. This is strictly a percussion disc, Holmes. Congas, bongos, shakers, cowbells — you get the picture.

Johnson is generous with his loop lengths; some of our favorites range from four to 16 bars long. Listening closely, we detected that certain of the longer items are actually two repeats of a shorter loop, but the majority seem to have been played straight through, not cut and pasted.

Supreme Beats uses the "groove construction set" approach to formatting. Following almost every loop are the single-instrument tracks that it's made of, which allows you to edit or remix the patterns. If you can find beats that you think will match, it's easy to layer a conga and talking drum track from one loop with the vocal chants of another, and so on. Very, very cool. Loops are usually played at several tempos — most often 93, 108, and 120 bpm. Single samples of the loop instruments can be found at the end of each CD in a section called "The Hits."

The first of the four discs, *Contemporary,* kicks off with stomping feet, clattering anklungs, bamboo brushes, and huff-and-puff vocal rhythms. One of our favorites is the Tropical Drum Talking loop (a single upward-bending note on the one, an infectious, driving conga pattern, and a trio of cowbells, tambourines, and shakers). Get down, Bashiri. Other disc highlights include the percussive footwork of tapster Hinton Battle on Charleston Tap, the pulsing Mozambique loop (timbales, congas, and guiro), and the hilarious Bash Novel (slide whistles atop clickety-clackety spoons atop a twangy jaw harp bass line).

A couple of acoustic oddities found their way onto this disc. Check out the instrument list for Vacume [sic] Groove and you'll come across such goodies as Darabuka, talking drum, bell bag, and, no joke, radiator. It's not the only automotive instrument featured on *Supreme Beats,* either (a brake drum makes an appearance on the fourth disc).

For songwriters and sample-savvy performers, the loops-within-the-loops are as valuable as the full-featured ensemble versions. A solo conga pattern might sound plain when compared to its densely packed counterpart, but simple loops like these are worth their weight in microchips. Layer one of these raw tracks with a stiff drum machine beat and you'll quickly learn the value of live percussion.

Don't be misled by their titles; the second CD, called *Dance Hip-Hop,* might bring to mind TR-808 kicks, synthetic hi-hats, crackly JB horn hits, shrieks, and so on. But with the exception of a few vinyl-sounding scratch effects, most of the material featured on this disc is played on congas, surdos, bongos, ocean drums, and the like. This doesn't mean that the grooves aren't funky. Check out the ultra-danceable Hip-Hop Triangle Gong loop, or the Tribal Vocal groove (complete with chest-beating vocals, shakers, and clattering iron). Delicious.

In general, organic instruments are the name of the game on *Supreme Beats.* With the exception of one or two unidentifiable sound effects, most instruments are of the unplugged persuasion. (We'd say damn near *all* are acoustic, but a photo of Johnson in the liner notes shows him stationed behind a rig that includes a few Roland pads. If he's triggering samples or synth modules, it isn't blatantly obvious. With products like Korg's Wavedrum hitting the market, however, the distinction between acoustic and electronic is starting to blur.)

One of our favorite percussion instruments, the talking drum, is well represented on this disc. In both ensemble and solo contexts, its pitch-bendy grooves are a knockout. If you're looking for a new musical flavor, you might try the twangy Hip Hop Berimbau loop. The Berimbau — a buzzy, one-stringed twanger — is an excellent match for Turtle Udu, bongos, quica, and tambourine

in this context.

While we locked into the grooves on all four CDs, the *African* disc really grabbed us by the throat. Infectious ethnic stomps can be found from start to finish, including such standouts as the chanting, ensemble-driven Wosa, E Toi E Toi, and Yebo. With the latter, both rhythm and vocal sub-tracks are provided.

The final disc, *World,* kicks off with a few solo conga patterns before launching into a loop called Island Congo. Ah . . . sandy beach, blue sky, hammock, fruity libation. Er, sorry. One of our favorites on disc four is track 24, Spoons. Since Soundgarden's 1994 hit "Spoonman" reintroduced the musical masses to the utensil, musicians from pole to pole have been raiding their kitchen drawers in search of a fresh, affordable percussive voice. Churning a killer spoon line is no easy chore, though — try it yourself sometime. We'll go the easy route and use one of these pre-fab phrases. And when we grow tired of 'em, we'll slice and dice them into fresh grooves with our trusty sample editor.

Another of our favorite percussion instruments, the Udu drum, is spotlighted on disc four. Tracks 34 through 42, called Just Udus, feature Johnson soloing atop the funky, blob-like device.

Before wrapping up, we'd like to commend the *Supreme Beats* team for a job well done in the documentation department. The 51-page booklet that accompanies the CDs provides not only such data as disc contents, track numbers, tempos, and so on, but also photographs of the instruments and background information on the players, the gear, and the recording techniques. Heck, they even gave the book an index — a rarity in the third-party sounds world. Outstanding.

No review would be complete without pointing out a few weaknesses — but as far as we can tell, this package has none. It's *that* good. Sure, $300 for the audio box-set isn't exactly small change; maybe offering each CD separately would be a comfortable solution for those on a tight budget. But if you've ever hired a professional musician for a session, especially one of Bashiri Johnson's caliber, you probably paid them that much for one groove. There's enough material here to feed an army of samplers. Bottom Line: If we had three thumbs, we'd turn 'em all up. *Supreme Beats* is a winner.

—Greg Rule

NORTHSTAR K2000 CD-ROM, VOL. 1

SOUND QUALITY	■■■■■
PROGRAMMING	■■■
BANG FOR THE BUCK	■■■

Format: Kurzweil K2000 CD-ROM.
Overview: Assorted acoustic instruments.
Contents: 41 banks, about 30 programs each, about 140Mb total samples. Acoustic bass, brass, piano, pipe organ, guitars, ethnic and orchestral percussion, strings, vocals, woodwinds, ethnic strings and winds, orchestra hits.
Suggested Retail Price: $395.
Contact: Northstar Productions, 13716 S.E. Ramona, Portland, OR 97236. (503) 760-7777. Fax (503) 760-4342.

While they're a little skimpy in terms of disk storage (140Mb is less than a quarter of what a CD-ROM will hold), Northstar's K2000 CD-ROMs are nevertheless an excellent value. The banks we auditioned were uniformly well sampled and well looped, and there's more creative patch programming than on many of the CD-ROMs we've looked at. This month we loaded up Vol. 1 of the set, which leans heavily toward acoustic instruments. Vol. 2 specializes in D-50 and DX synth banks and other pop-oriented materials.

About half of the banks weigh in just above or below 4Mb. Many others are less than a megabyte. Only a few (the Bösendorfer piano and female vocals in Vol. 1) are 8Mb banks. This probably makes sense in terms of how people will use the materials — but

0.34Mb just isn't enough memory for a ballsy French horn. At least, maybe some other sound developer could manage such a hat trick, but Northstar didn't.

The 8Mb Bösendorfer is beautifully done, with long smooth loops, unobtrusive split points, and a full rounded tone. We'd be very happy playing light classics on this piano; we leaned toward the velocity split programs, which use the same keymap for the soft and hard velocities but have more filtering on the softer notes. The notes in the low bass range die out too quickly, and overall there's less hammer thwock than there ought to be. That's why we said "light classics." Mostly you don't miss the hammer's percussive attack, but if you bang down on a two-handed block chord, it sounds almost bowed; you can't pound with this piano.

The loops are just as smooth on the string section samples. We'd have no hesitation in using them for a warm string pad. We do wish that the violins matched the celli better. The cello section is small — no more than four players, by the sound of it — while the fiddles are very full.

The basses are solo, but orchestral in style; there's one bowed bank and two pizzicato. One of the pizzicato banks is quite dry (short notes, in other words), while the other is full enough to be used for jazz. The programming covers the basic bases, but offers little in the way of frills. Each bass is presented with several different effects (room, hall, chorus, dry), tuned in fifths and octaves, with key pressure routed to bend the pitch up or down, with velocity switching to the alternate attack point, and so on. Each bank is rounded out with a couple of synth basses. These beef up the bass samples — nearly obliterate them, in fact — with the K2000's internal square and saw waves. We spotted only one program that used the control slider, and it was a synth bass program. The slider is used by some programs in other banks, but only sparingly.

The French horn bank contains two multisamples, neither of them very lively. Pressure introduces vibrato and also speeds up the vibrato LFO. We were hoping for a pressure patch that would make a brass swell, but there isn't one. The patches that layer Northstar's brass with the K2000's internal trumpet and trombone are real grabbers, though. The piccolo trumpet is a nasal throwaway, but the 4Mb trumpet section is bright and full, ready for your next fanfare. They even figured out how to get a fool-you muted sound using the K2000 filters. According to Northstar, "throwaway" is not entirely the wrong word. Such banks as the French horn and piccolo trumpet were developed for their floppy disk library, which is why the banks are so limited in memory size. Think of them as added extras, not as the meat of the CD.

The African percussion bank is very evocative. Several hits are provided on each of several drums, for more realistic tracking. Thoughtful programming options include a kit with a heavily resonant flanger (perfect for techno rhythm riffs), a kit with velocity routed to pitch for added realism, and a slew of single-drum programs for tuned patterns. The 4Mb handbell bank is another winner, with crisp, well-looped samples and good programming options, including a bell/electric piano layer and a classic D-50-type bell pad that includes authentic echoes and chorusing.

With our deadline fast approaching, we found a minute to load the autoharp, koto, and tambura banks. Yum! The two-octave koto arpeggios are bound to be good for something, especially since the ascending and descending versions (both on the same Phrygian pentatonic scale) are closely enough matched that you can alternate the two and give the impression of a koto player strumming endlessly. And we can't wait to try layering the bright, metallic autoharp with the glittering orchestral bells. Good stuff, all of it.

—Jim Aikin

KEYBOARD 19th ANNUAL READERS POLL

So here we are, the March issue already. Why wait this long into '95 to run the 19th annual *Keyboard* Readers Poll? Would you believe we've decided to turn it into a Valentine's Day event? How about, it's easier to write stuff like "March right out and vote" in the March issue? We're trying to see how many of you can remember 1994?

The truth is, nobody knows why the Poll didn't make it into the first two months of '95. Things happen: You go to lunch, you doodle around with a few new ballot ideas, you go home. All of a sudden, whammo, it's March. Which actually is just as well. By the time you read this, your horrible New Year's Eve gig will be but a distant ringing headache, and you'll be able to get some perspective on what happened last year. You've had time to mull over November's election results, for instance. What did it mean for keyboard players? Obviously, it means lightening up on the left hand (no more "strides" forward) and trying to swing harder on the right, not to mention getting your film score chops up to speed for *Boys' Town II*.

But before they start Dole-ing out soundtrack assignments, take a few moments to pay tribute to the best players, composers, and products of 1995 via the *Keyboard* Readers Poll. Despite all those annoying guitar players and talk show hosts, plenty of keyboard action found space on the airwaves. There were lots of solid solo albums, band projects, back-breaking tours, club dates. In home studios and on stadium stages, your favorite players made history, and lots of killer music, last year, while their counterparts on the manufacturing side were busy building and tweaking the tools we use to add our music to the chorus of synths, pianos, samples, and sequences.

Since we published our first ballot back in '76, the *Keyboard* Poll has been *the* best way for keyboard players to pay tribute to the top talent in their field. Great as it is to get fan mail and sell tons of records, there's something special about winning kudos from people who do what you do. That's why so many winners, from Vladimir Horowitz through today's top players, have sent their thanks to us — actually, to *you* — once the results are published. Here's your chance to make them feel appreciated again.

As always, we've listed nominees under various headings, partly to help define what each category means. If we overlooked your fave, don't get mad — get even by letting us know about it with your write-in vote. That's what the top line under each heading is for.

That's not all. As part of our 20th anniversary celebration, we're offering five one-time-only awards to players and manufacturers for achievements over the past two decades. Usually the Poll is restricted to players who were active onstage and/or in the studio over the previous year, but just this once you get a chance to vote with a clear conscience for the greats of the '70s, '80s, *and* '90s, whether or not they're still playing — or, for that matter, breathing.

Looking back over the past 20 years, who was the Best Keyboard Artist? What was the Best Keyboard Solo? The Best Rhythm Track? The Best Keyboard Composition? Oh, and what was the Best Piece of Keyboard Gear?

Tough choices. Lots of worthy candidates. Give it your best shot.

Remember, aside from the five special categories, your choices are based on what each artist did *during 1994*. So dust off that calendar — "Jan. 1, 1994. Heard great Minimoog solo on 'Auld Lang Syne' at The Bucket o' Blood. First chorus definitely began after midnight." — and send us your vote. We'll tally the results in mid-April and announce the winners in our June '95 issue. Unless those pesky lunches get in our way again.

OVERALL BEST PLAYER. All keyboard players and sequencing musicians are eligible in this category.

❑ _____

BEST NEW TALENT. Those who popped up from the ooze during '94.

❑ _____

❑ ACE OF BASE
❑ ANGEL C.
❑ BRIAN CULBERTSON
❑ SEIBOLD (HATE DEPT)
❑ NATASHA SHNEIDER (ELEVEN)
❑ JACKY TERRASSON
❑ VIVIAN TRIMBLE (LUSCIOUS JACKSON)
❑ ADAM WAKEMAN

BEST ALBUM. Any keyboard or electronic instrument, any style. (Sampled didgeridoo is eligible, but real didgeridoo isn't. It's a virtual kind of thing.)

❑ _____

❑ TORI AMOS, *UNDER THE PINK*
❑ LAURIE ANDERSON, *BRIGHT RED*
❑ BEAUTIFUL PEOPLE, *IF '60S WERE '90S*
❑ HARRY CONNICK JR., *SHE*
❑ CONSOLIDATED, *BUSINESS OF PUNISHMENT*
❑ TOM COSTER, *THE FORBIDDEN ZONE*
❑ DIXIE DREGS, *FULL CIRCLE*
❑ THOMAS DOLBY, *THE GATE TO THE MIND'S EYE*
❑ DREAM THEATER, *AWAKE*
❑ JAN HAMMER, *DRIVE*
❑ EMERSON, LAKE & PALMER, *IN THE HOT SEAT*
❑ EMERSON, LAKE & PALMER, *THE RETURN OF THE MANTICORE*
❑ ERASURE, *I SAY I SAY I SAY*
❑ FUTURE SOUND OF LONDON, *LIFEFORMS*
❑ THE ORB, *LIFE 93*
❑ THE ORB, *POMME FRITZ*
❑ ORBITAL, *DIVERSIONS*
❑ TRENT REZNOR/NINE INCH NAILS, *THE DOWNWARD SPIRAL*
❑ KLAUS SCHULZE, *TOTENTAG*
❑ YELLO, *ZEBRA*
❑ YES, *TALK*

BEST ROCK PLAYER. Any style of rock, from speed metal to middle-of-the-country.

❑ _____

❑ KEITH EMERSON (ELP)
❑ JOIE HINTON (OZRIC TENTACLES)
❑ BRUCE HORNSBY
❑ BILLY JOEL
❑ ELTON JOHN
❑ BOOKER T. JONES
❑ MARK KELLY (MARILLION)
❑ SASCHA KONEITZKO (KMFDM)
❑ BILL LYB & RHYS FULBER (FRONT LINE ASSEMBLY)
❑ SHAI DE LA LUNA (LORDS OF ACID)
❑ PAGE MCCONNELL (PHISH)
❑ JORDAN RUDESS (DREAM THEATER/DIXIE DREGS)
❑ PAUL SHAFFER
❑ STEVE WINWOOD (TRAFFIC)

BEST JAZZ PLAYER. From stompin' stride to fusion and avant-garde, as long as it swings.

❑ _____

❑ CHICK COREA
❑ TOM COSTER
❑ JOEY DE FRANCESCO
❑ GEORGE DUKE
❑ BENNY GREEN
❑ HERBIE HANCOCK
❑ KEITH JARRETT
❑ KENNY KIRKLAND
❑ JEFF LORBER
❑ MARCUS ROBERTS
❑ GONZALO RUBALCABA
❑ MEL SIMPSON (US3)
❑ MCCOY TYNER

BEST CLASSICAL PLAYER. The grahnd piahno. Also harpsichord and synth.

❑ _____

❑ EMANUEL AX
❑ VAN CLIBURN
❑ KATHY GEISLER
❑ IGOR KIPNIS
❑ EVGENY KISSIN
❑ GUY KLUCEVSEK
❑ MICHAEL NYMAN
❑ GARRICK OHLSSON
❑ URSULA OPPENS
❑ ANDRAS SCHIFF
❑ ANDRÉ WATTS
❑ ARTIS WODEHOUSE

BEST DANCE ARTIST. Hip-hop, R&B, and techno, as long as it's got that booty-shakin' kick drum.

❑ _____

❑ RUNE B. & IAN ION (OVERLORDS)
❑ BIGOD 20
❑ RAY CARROLL (WATERLILLIES)
❑ DAVID COLE (C+C MUSIC FACTORY)
❑ DENZIL FOSTER/THOMAS MCELROY
❑ PAUL HARDCASTLE
❑ KENNY LARKIN
❑ JASON MILES
❑ PUBLIC ENEMY

NEW AGE ARTIST. Doesn't matter if it's electronic or acoustic, as long as it . . . as long as . . . as . . . What was I saying?

❑ _____

❑ DAVID ARKENSTONE
❑ WILLIAM AURA
❑ SUZANNE CIANI
❑ PETER KATER
❑ KITARO
❑ DAVID LYNCH
❑ GEORGE WINSTON
❑ YANNI

BEST FILM/TV SCORE. The hi-tech Hollywood composers deserve a category of their own. The emphasis is on scores created and/or orchestrated electronically.

❑ _____

❑ RICHARD RODNEY BENNETT, *FOUR WEDDINGS AND A FUNERAL*
❑ RANDY EDELMAN, *THE MASK*
❑ BRAD FIEDEL, *TRUE LIES*
❑ RICHARD GIBBS, *CLIFFORD*
❑ ELIOT GOLDENTHAL, *INTERVIEW WITH THE VAMPIRE*
❑ MARK MANCINA, *SPEED*
❑ ENNIO MORRICONE, *WOLF*
❑ THOMAS NEWMAN, *THE SHAWSHANK REDEMPTION*
❑ TRENT REZNOR, *NATURAL-BORN KILLERS*
❑ RYUICHI SAKAMOTO, *LITTLE BUDDHA*
❑ ALAN SILVESTRI, *FORREST GUMP*
❑ MARK SNOW, *THE X-FILES*
❑ HANS ZIMMER, *THE LION KING*

ELECTRONIC INSTRUMENTAL ARTIST. The synth whizzes whose music falls somewhere between clouds of new age reverie and pits of mosh.

❑ _____

❑ APHEX TWIN
❑ CABARET VOLTAIRE
❑ THE ORB
❑ ORBITAL
❑ KLAUS SCHULZE
❑ TANGERINE DREAM
❑ JOHN TESH
❑ YOUNG AMERICAN PRIMITIVE

BEST HIRED GUN. A category for people most folks never heard of. Faceless, nameless, unsung, but indispensible to those enlightened stars who realize a little synth and/or piano backup never hurt anyone.

❑ _____

❑ WALTER AFANASIEFF
❑ DAVID GOLDBLATT
❑ RALPH GRIERSON
❑ MIKE LANG
❑ CHUCK LEAVELL
❑ JASON MILES
❑ GREG PHILLINGANES
❑ STEVE PORCARO
❑ FREDDIE RAVEL
❑ MATT ROLLINGS
❑ DAVID ROSENTHAL
❑ DAVID SANCIOUS

OUTSTANDING TECHNOLOGICAL INNOVATION. What piece of hardware or software set the pace in '94?

❑ _____

❑ E-MU MORPHEUS
❑ KORG WAVEDRUM
❑ MARION SYSTEMS MSR-2
❑ MOTU FREESTYLE
❑ STEINBERG RECYCLE
❑ TURTLE BEACH QUAD STUDIO
❑ YAMAHA PROMIX 01

THE LONG VIEW: 20-YEAR POLL

THE MOST IMPORTANT KEYBOARD ARTIST. Whose shadow casts longest over the synth and/or piano landscape?

❑ _____

BEST PIECE OF GEAR. If it was in production in 1975 or since, it's eligible. Does "gear" include software? You be the judge.

❑ _____

BEST KEYBOARD SOLO. "Listen, Bill Evans did this *burnin'* 'Theme from *M.A.S.H.*' at a gig in '77. Let me tell you about it. . . ."

❑ _____

BEST RHYTHM TRACK. Hundreds of worthy candidates — but can anyone tell them apart? (Joke. *Joke!*)

❑ _____

BEST COMPOSITION. Again, a huge range of choices, especially when you include electronic works that weren't written to be played on a keyboard.

❑ _____

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The Punch Factor

CRAIG ANDERTON

We all know a punchy recorded sound when we hear it — but what exactly constitutes "punch"? Based on some recent research, it seems that perhaps punch is something that can be not only defined, but quantified.

I started looking into the punch factor because I wondered why seemingly every musician I talk to agrees that the Minimoog has a punchy sound. When I started playing a Peavey DPM3, several people again commented that my bass patches had a punchy sound, "like a Minimoog." Clearly, the technologies of the two instruments are totally different: One is analog, the other digital; one uses voltage-controlled oscillators, the other sample playback. Yet to listeners, they shared some common factor that was perceived as punchiness.

Recording a Minimoog bass line into Digidesign Sound Tools (Figure 1) revealed something interesting: Even with the envelope sustain control set to minimum, the sound stayed at a maximum level for about 20 to 30 milliseconds before the decay began. There is no way to eliminate that short period of peak volume; it's part of the Minimoog's characteristic sound.

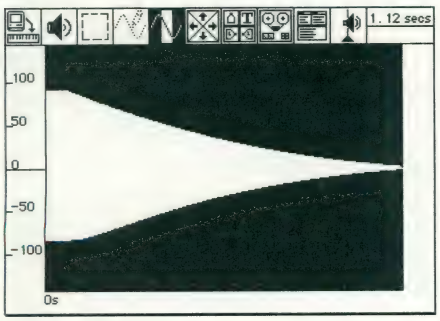

Fig. 1. Minimoog envelope attack, peak hold, and decay characteristics. Note the fast attack and the short, fixed hold time before the decay portion begins.

I looked at the DPM3's amplitude envelope and found that it exhibited the same characteristic — a 20-30ms maximum-level sustain before the decay kicked in. Also, both instruments had virtually instantaneous attacks. Could this combination be the secret of punch?

For comparison, I next checked two synths that nobody considers punchy-sounding: an Oberheim OB-8, which is generally characterized as "warm" and/or "fat," but not punchy, and a Yamaha TG55. Both had fixed attack times, *even when the attack control was set to zero*, that lasted for a few milliseconds. I also recalled some experiments ex-Peter Gabriel keyboard player Larry Fast ran in the mid-'70s, when he was curious how fast an attack had to be for a sound to be punchy. His research indicated that most listeners noticed a perceptible loss of punch with attack times as short as one or two milliseconds.

So it seems the secret of punch is that you need an extremely fast attack time, but you also need a short segment where the sound sustains at the maximum volume level. This segment — let's borrow E-mu's envelope terminology and call it the "peak hold" — isn't long enough to be perceived as sustain *per se*; it's more of a psychoacoustic phenomenon. Worse luck, most synthesizers won't allow you to program a peak hold. Either it's there or it isn't. The E-mu Proteus and Emulator have AHDSR envelopes, however, which include a hold segment between the attack and decay. [*Ed. Note: In our listening test, we found that a hold value of 01 (with an attack of 00 and a decay of between 18 and 25) seemed to add punch to the sound.*]

Wondering if this theory would stand up with other sounds, I took an unprocessed snare drum sample and tried to add punch by normalizing each single wave cycle within the first 20ms to the highest possible level. (This was done in Passport's sample editing program, Alchemy, by highlighting each half-cycle and normalizing it to take up all of the available headroom.) The left half of Figure 2 shows the original drum sound; note the quick, obvious decay. The right half shows the same sound after I normalized the cycles in the initial transient. Auditioning the two sounds left no doubt that the edited version had more punch than the original.

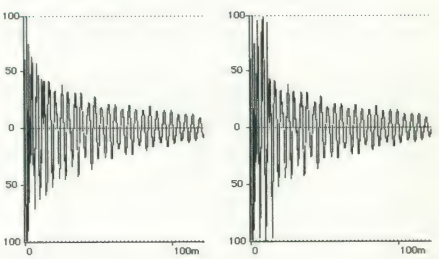

Fig. 2. Editing a drum sound's attack to add punch. The original sample is on the left. On the right, I've normalized individual wave cycles to add an artificial peak hold to the sound.

Other examples abound: Analog tape probably sounds punchy to some people because they're hitting the tape hard enough to cause saturation, thus rounding off the initial attack transients and giving loud sounds that magic 20-30 milliseconds at full volume. Last month I alluded to using digital clipping

ILLUSTRATION: **WAYNE VINCENT & ASSOCIATES**

to add punch. This does essentially the same thing as tape saturation, although tape distortion creates nicer harmonics than digital distortion. (However, the period during which the distortion occurs is so brief that the harmonic structure may not make much difference.) And of course, both compression and limiting — which were the first effects designed to add punch — squash a sound's attack if it starts out louder than the decay.

But what if your synth's envelope doesn't have a fast attack and a brief period of full-level hold? There's not much you can do about the attack, but a little clipping (achieved with something like a guitarist's overdrive effect) can cut off the top of a waveform and give the required hold segment, as can a limiter. The key point is to set the threshold high enough that you clip or limit only a few milliseconds of the sound.

In closing, here's a word of caution: Just as you don't want to fill up a musical arrangement to the point where it's cluttered, you don't want to "overpunch" every sound you use. For example, suppose a kick drum and a bass note hit at the same time. Consider adding punch to the kick to reinforce the rhythm, but leave the bass alone. Its attack will probably be masked by the kick drum transients anyway. A continuous succession of punchy sounds can fatigue the ear, so add punch sparingly. ■

*Craig Anderton has played Carnegie Hall, done session work for Columbia, Epic, Metromedia, and RCA, worked on two best-selling new age albums (*Valley in the Clouds *by David Arkenstone and* Emerald *by Brewer, Tingstad, and Rumbel), and produced three albums by classical guitarist Linda Cohen. He is a consulting editor for* Guitar Player *magazine and technology editor for* EQ.

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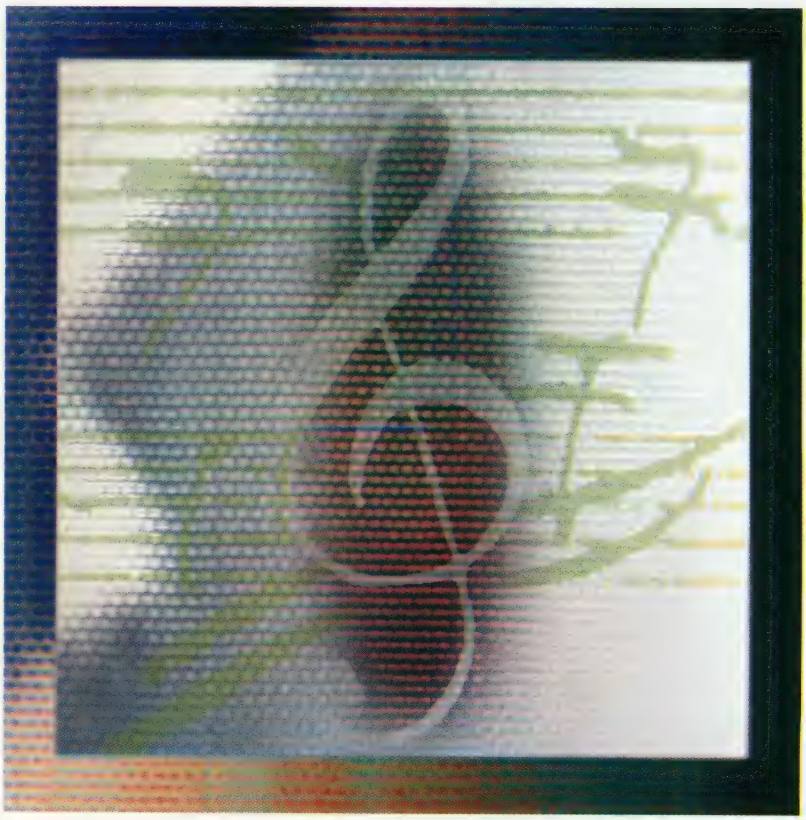
BOB SAFIR

Long Live Linear: Using Video in Multimedia Scoring

There's been a lot of talk lately about discovering "whole new paradigms" in music scoring for multimedia, paradigms that incorporate a "new model" for interactive sound. I get a little bit skeptical when I see people touting "whole new paradigms." And I get really skeptical when "new model" is used in the same sentence.

The theory goes on to state that music must now be thought of on the "atomic" level — individual phrases broken down into individual notes, and the notes reduced to their component characteristics, maybe all the way down to the sample level. These sounds will be accessed in a nonlinear fashion, depending on what action is taken by the user at any given point in time. The linear way of looking at things, so the theory goes, is dead and gone.

I disagree with this theory. I have even discovered that old-fashioned linear production methods can come in handy in multimedia music production. Case in point: scoring to video.



There are several ways to use video in a multimedia music production environment so as to enhance your final product. The first one is very simple. Last month I discussed how scoring music to picture (even a rough storyboard) can make a big difference in the synergy between visual and audio elements. If the developer can furnish you with other visual components, such as animation, or even electronic storyboards, you can take the synergy to a higher level.

Assuming you don't have a tremendous arsenal of computers and video game machines on every platform and in every model, having the capability to transfer images to videotape can prove to be a tremendous benefit. Say for example that you're composing music for a Macintosh product. If the developer provides you with preliminary animation scenes, it would be ideal to run them on the computer while simultaneously working on the music. If the Mac were truly a multitasking machine, that might be possible. If you have two Macs, it's easy. However, if you only have one Mac, there is still a way out, and it might even be preferable to these other methods.

The solution is to transfer the images to videotape and stripe the tape with SMPTE timecode. Now you're ready to go to town! (Some newer music software packages enable you to incorporate QuickTime files within them, but that's the subject of another column.)

There are several products on the market that enable you to grab the images from either a Mac or PC screen. Scan converters, until very recently, were out of the reach of most budgets, as they averaged around $20,000. Although these are still available for purchase, they are probably higher-quality than you need for the tasks we're discussing here. A high-end scan converter will provide much better quality than the budget models, so if you're doing professional work that requires the best possible flicker-free image, you might have to take out that bank loan after all. For the rest of us, there are several reasonable choices on the market.

I happen to like the TelevEyes/Pro video scan converter from Digital Vision, because it will work with both the Mac and the PC. It does a decent job (it has slightly better resolution on the PC than on the Mac), and it's priced reasonably. (The high-end model is around $700.) It's extremely easy to use, as it hooks up between the computer and the monitor. It also has a built-in genlock/overlay feature, which enables you to add titles on top of existing video. It has both composite and S-video inputs and outputs. Several other companies make scan converters; some are less expensive, some more.

So what can you do with one of these puppies that makes it worthwhile? For one thing, you can take the preliminary animation segments from the developer's alpha release and transfer them to tape. Rewind the tape and use your favorite MIDI/SMPTE interface to lay down a SMPTE track on the tape. You can do this easily using the audio insert feature on the most basic of VCRs. After ensuring that you've got good levels, just lay down the SMPTE code on the linear tracks of the tape. (You could also choose to lay down the code while transferring the new "master" to another copy, recording picture and sound at the same time. You'd lose a generation — which may not matter — and you'd get the timecode onto the vertical interval tracks. Either method works fine.)

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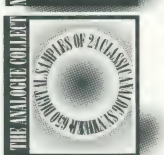

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Spr Rap Kit 2
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EX Pop Collection	47
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AD Filmtexture	49

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storyboard." Instead of imagining how the music might play out when the opening title screen dissolves into the opening credits, simply check it out. If you need to make adjustments in the timing of the segments, you can do it with absolute precision. That's the beauty of working with time-coded video. You can do reality checks on the basic feel to see if you're on track, or you can make precise music edits to ensure that the final music will work. Being "locked up" to picture gives you both capabilities.

A fringe benefit of this method is that you can provide the developer with a copy of the tape for an approval cycle. "Here's what I did. Like it? You want to make a change? We still have time!"

Needless to say, the same method will work if the developer is using video (and many of them are) in the game itself. Score to picture, just as if you were . . . well, scoring to picture.

Other applications: Use video to create a demo. Use video to record scenes from competitive products until your developer is ready to give you the real thing. Use video to record scenes that will inspire your composition. Use video to show your relatives what you're doing because the project just slipped another three months.

After doing most of these things myself, I've come to realize that there is still plenty to learn from the "old" ways of doing things before we hastily discard them. Many interactive games have suffered from the lack of synergy between the visuals and the music. Before we look for *new* paradigms, which may or may not be beneficial, why not use some of the techniques that have made film and television music successful?

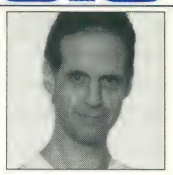
If we begin to dissect what's going on in any of these media, the first thing we find is that titles consist of *scenes*, whether they're interactive or not. A scene has a mood or theme. The scene may last a few minutes, or a few seconds. But it still has a need for an underscore that conveys an emotion at a given point in time.

I looked at my VCR in the studio this morning. It almost seemed as if the display read, "Rumors of my death have been greatly exaggerated."

Bob Safir is president of InterOctave, a San Jose/L.A. company specializing in original music and sound design for interactive multimedia, and a former multimedia product manager at Microsoft and product manager at E-mu Systems. He is the founder and co-chairman of the Interactive Audio SIG of the MIDI Manufacturers Association.

The Horrible Dream Competition

DAVE STEWART



In response to an invitation issued many moons ago in this column, a handful of intrepid souls have bared their psyches and sent in their worst musical nightmares for your delectation. We applaud their courage, even as we prepare to split our sides laughing. The original request, you may remember, was for Horrible Dreams, but real life can be a nightmare too, and we make no apology for also including one or two Regrettable Incidents suffered by musicians in their waking life. These too have their humorous side, but more importantly, they pad the article out nicely.

To help you understand these bizarre episodes and unravel the twisted, Freudian logic of some of the dreams, we have enlisted the help of a panel of eminent thinkers, psychologists, music critics, and other opinionated, big-headed bastards, who will give their expert analysis of each story. Some of you may think these sweaty tales are funny. Others may think it's all a cheap ruse to get Dave Stewart's readers to write his column for him while he spends yet another evening at the local pub, boring the regulars about how he used to play organ with Egg. To the former, we say this: *Don't laugh. It could happen to you.* To the latter, we issue this plea: Shut up, before the editor finds out. [*Ed. Note: What's that?*]

Horrible Dream #1 (Franci De Franco, small town piano teacher)

My dream starts with me at the most monstrously large pipe organ I have ever seen — it was at least eight tiers high, and the bench was so low I couldn't reach the keys. Above me, looking down, was a huge choir, I think it was the Mormon Tabernacle or that British one. It was an enormous venue — I believe it must have been Carnegie Hall, but a much bigger version — and it was full. The conductor, the choir, and thousands of people in the audience were looking at me, but I didn't know what to play, and had forgotten my music. [Try "Louie Louie" — D.S.] *I don't even* play *the organ. The silence was deafening. I felt the panic attack beginning in the pit of my stomach, rising up into my lungs with the most deathly stage fright I have ever experienced, and I did what everybody else wishes they could do when they're frightened to death — I shrieked 'Mom!!!' She was there. She rushed up with my music — the old books from my childhood with the gnomes on them.*

Horrible Dream #2 (Bill Bruford, drummer)

I dreamed that I was Frank Sinatra — don't laugh — and I was playing at the Royal Festival Hall, London. I'm feeling good, I'm relaxed . . . the orchestra are happening, playing these Nelson Riddle arrangements.
Hey. Then I

walk out on stage, and my mind's a blank — it's all gone. I can't remember any of the words. It was terrible. . . . Carolyn [Bill's wife] *had to wake me up, I was shouting.*

Hans Van Bellinger, clinical psychologist, author of *Stress and The Musician*, writes: "Both dreams exhibit classic feelings of inadequacy, displacement, dislocation, and alienation. Stage fright and memory loss are every musician's deepest fears, made worse in these cases by the ego's refusal to stage the nightmare in a modestly sized venue — I mean, neither of these dreams takes place in the Willeseden Working Men's Club, do they? The sentence, 'I don't even *play* the organ,' in Mr. De Franco's dream is very significant. The sufferer is placed in an unfamiliar situation in the full glare of the spotlight, and — harrumph, excuse me, I find this quite funny, they — ha! ha! — they, how do you say, 'make a hash of it.' Ha ha ha!"

Regrettable Incident #1 (from *Sinfonietta* magazine, U.K.)

Health officials are to check the safety of large orchestras on tiered seating after a musician came uncomfortably close to playing the last trump. A deafening blast on the klaxon, marking the climax of a modern German composition called the "Scream of Death," was followed by a crash as trumpeter Andy Store-Fewings fell from the stage at Huddersfield Town Hall and tumbled unconscious into his orchestra's string section. Mr. Store-Fewings, aged 35, blamed his collapse and ten-foot tumble on excessive zeal: "I must have used a lot of breath hitting that top G♯ note and blacked out. The next thing I knew was finding myself on the floor behind the double bass, being comforted by a woman colleague."

Reg Higginbottom, Chief Health & Safety Officer, Huddersfield City Council: "Safety is regularly checked at all Huddersfield music venues, but we will be looking carefully into this incident. We do sometimes get problems with brass players — hadn't been at the bottle, had he? Ha ha! Only joking."

Edwin Duck, music critic, *Sinfonietta* magazine: "The 'Scream of Death,' the final opus of Heinrich Schtültz's 'Skull' trilogy, seems dogged by controversy and disaster. There was a riot at its premiere in Nuremberg, a fatal shooting at its first performance in Paris — yes, the composer himself was shot, I'm afraid — and when it was performed in Cologne, the concert hall collapsed. It's a *foul* work, and some say it's jinxed. Members of the audience regularly black out during the fortissimo passages, but this is the first time I've heard of a musician so afflicted. I say — off the record — heard the old joke? 'Have you heard any Schtültz?' 'No, but I've *stepped in some*!' Wugh wugh wugh — not bad, eh?" (Readers having difficulty understanding Mr. Duck's clipped English accent will find subtitles on page 117.)

Regrettable Incident #2 (Martin Brookes, gigging keyboardist, L.A.)

My worst musical nightmare happened when I was in a backing band to a 'name' R&B

ILLUSTRATION: **TOM LANAUX**

artist who'd been big in the '70s and was making a comeback. The group consisted of two keyboard players (one of whom was me), bass, and drums. Normally, we were a tight, powerful unit, until one fateful winter's night in Augusta, Georgia. We'd been holed up in the same hotel for three weeks, and to relieve the boredom, the drummer (an old pro who could keep it in the pocket even after drinking a whole distillery) decided to show the young keyboard player some of the more exotic ways of relieving road boredom. Observing the pile of empty bourbon bottles, the thick clouds of smoke billowing from their hotel room, and the 'piss holes in the snow' where their eyes should have been, I predicted that we were in for a real interesting gig that night.

We started the set and things went okay for a while, despite the fact that the other keyboardist had tuned his synths a quarter-tone out from mine. This caused the singer a few difficulties, but he just about managed to keep it together, though his panic-stricken expression betrayed his inner turmoil. The real trouble started midway through the set, when we reached our show-stopper, a real sexy slow ballad that just drove the ladies wild. [sic] *In this orgasmic epic, 'name' artist could really do his 'name' thing, singing 'ooh yeah, honey!' while the audience yelled back, 'sing it, "name" artist!' and called out his, er, name. Well, we took it down* [D.S. Note: gigging musicians' term meaning "to play quieter"] *and we took it down some more, and we took it down a whole lot more. We took it down so far that the drummer fell into a near-coma and just sat there nodding his head and clicking his fingers, his body crumpled into a sort of sagging bean bag. Then suddenly, like a collapsed puppet having its strings yanked, he lurches upright and veers off like an automaton into the audience, fingers still clicking. The young keyboard player decides to follow his lead and also weaves off, fingers smulching, into the crowd. The bass player, normally a sensible fellow but overwhelmed by peer pressure, follows suit, flashing me a doomed, 'last lemming' look as he does so. This is definitely not planned, and I see the 'name' artist's eyes widen. With a deep sigh, thinking 'oh golly' (but not in those words), I do the 'professional' (i.e., stupid) thing and follow my finger-clicking colleagues offstage, leaving 'name' artist abandoned, singing for his life, a look of apoplectic horror on his face, his band off on a mission that every audience member shall click his or her fingers. So now all four of us are wandering round the club foolishly clicking out the beat. I'm dying, but the $20-a-head audience think it's great, poor fools. The drummer is making new friends, the keyboard player is making friends no one else can see, the bass player is looking for the exit. Time has stood still in this club. Eternity stretches before me, an infinite road lined with finger-clicking pedestrians. The agonized interval between each finger click expands from seconds to decades, and my whole life flashes before my eyes. It goes on . . . and on . . . and on. . . .*

(to be continued)

David L. Barg, author of the Halcyon Frequency™ Mega-Course: "To unlock your own Halcyon Frequency potential, simply send $900 to . . ."

Dave Stewart, keyboard player, crap journalist: "Oh, shut up. I was at that gig, and noticed nothing amiss."

David L. Barg: "If you'll just let me finish . . ."

Buford P. Bullroarer, Chief of Police, Augusta, Georgia (interrupting, through megaphone): "Possession of cannabis is a crime under the 'Things You're Not Allowed to Have' Act of 1922. Offenders face 25 years in jail and a $7,000,000 fine." (Fade up police sirens.)

Theophilus Q. Wildebeeste, soul singer: "Y'all shut up, y'hear? Those boys ruined my career. Stop laughing, it ain't funny. I'll be back. [Falls to knees.] Oooh, honey, yeah, you know I can't *live* without your *lurve* . . . and I'm gonna sing it to the stars *aburve*. . . ."

Tom Darter, harrassed editor, *Keyboard* magazine (shouting): I think we've had enough expert analysis. Wheel in the next horrible dream, for God's sake."

Horrible Dream #4 (Mike Boyer, Saint John, Canada)

Dear Dave, I'm sorry I didn't enter your Horrible Chord Competition, as I don't know any *horrible chords.* [Bloody goody-goody — D.S.] *However, I do have two horrible dreams. Each dream occurred only once, but their horribility remains undiminished in my mind. The first dream happened several years after I got my first poly synth, a Yamaha CS-60.* [Cue suppressed giggling from readers.] *In the dream I awake one morning and look across my bedroom to where the much-adored keyboard sits, only to discover a* huge hole *in the centre of the front panel as though a 20mm cannon had been fired through it! Oddly, there was no exit wound.*

The second dream was of a more musical, less violent nature. [Shouts of 'shame'!] *I am in the wings waiting to go onstage to audition for none other than Frank Zappa, and I am completely unprepared. Not only do I not know how to play any of his songs, I have to audition with another keyboard player at the same time who, of course, has all his charts in perfect order and has technique streaming from every orifice. Damn. Well, the call is made, so out we go, and I discover that none of my gear will make a sound. Frank calls a tune and the other guy launches into it with gusto; meanwhile, I'm on my hands and knees under my rig trying to make it go, but it seems that all my cables have failed or something horrible has happened to the gear itself. The problem is never made clear, but I miss the entire audition, and surprisingly, do not get the gig. Damn. Thankfully, I awoke before Frank got to say a word.*

Mark Vail, author of *Vintage Synthesizers*: "Later models of the Yamaha CS-60 were actually manufactured with a gaping hole in the centre of the front panel, in response to users' complaints that it had 'too many knobs.' The exit wound, useful for extending an arm through the body of the instrument to reach a telephone or donut, is available as a retrofit from Silly Bugger Electronics of Santa Monica."

Dave Stewart, author of *Your Daft Dreams Explained*: "By a remarkable and eerie coincidence, these two dreams are identical to two of mine, down to the last detail. In the first, I dreamed that the enormous hole I hacked in my Prophet-5 with a scimitar in 1981 (it was a publicity stunt, one which I regret) has been miraculously healed by Mother Theresa of Calcutta. She smiles at me, and says, 'Go on, Dave, play it — you'll find the oscillator tuning is a lot more stable now.' I fall to my knees and kiss her feet, which are a bit smelly. In the second dream, I too am auditioning for Frank Zappa. I have my charts in perfect order, technique streams from my every orifice, I launch into a tune with gusto, and all my gear works perfectly. Frank is impressed, but the two of us can't help but notice that, over on the other side of the stage, a keyboard player called Mike Boyer is making a bit of a prat of himself."

Hans Van Bellinger, author of *Coincidence — That's Probably All It Is*: "Ha ha ha! We have four very stupid dreams. It is bad to, how do you say, make a prat of yourself in front of Frank Zappa, yes? I think so. But to make a donkey of yourself in front of The Ramones — I think this is worse. Ha ha ha ha!!"

There we must leave the mad, horrible world of Dave Stewart's readers' psyches, as someone desperately wants the rest of this space to write something boring about computers or hard disk editors. However, do not despair — we'll be back next month, same time, same place, with the concluding episode of the Horrible Dream Competition, including a charming amputation story from Down Under. Will Martin Brookes escape from Finger Clicking Hell? Is this the end of a perfect working relationship for Bill Bruford and Frank Sinatra? What's the difference between E.M.I. Records and the Titanic? Find out in next month's *Keyboard*, the magazine which dares to pierce the veil of dreams. ■

Dave Stewart lives in England, though it's sometimes difficult to tell because of the fog. He is actively engaged in music-making with his partner Barbara Gaskin, and you can write to them, though this is by no means obligatory, at the following address: Broken Records, P.O. Box 4416, London SW19 8XR, England. Broken Records is a one-group (i.e., Dave and Barb) label with inadequate funding, so if you send them tapes, they won't be able to release them. Sorry! They don't mind listening to them, though. . . .

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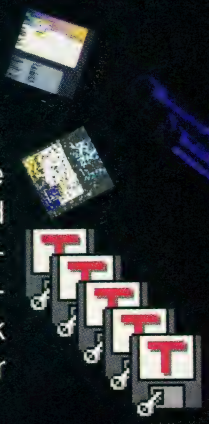

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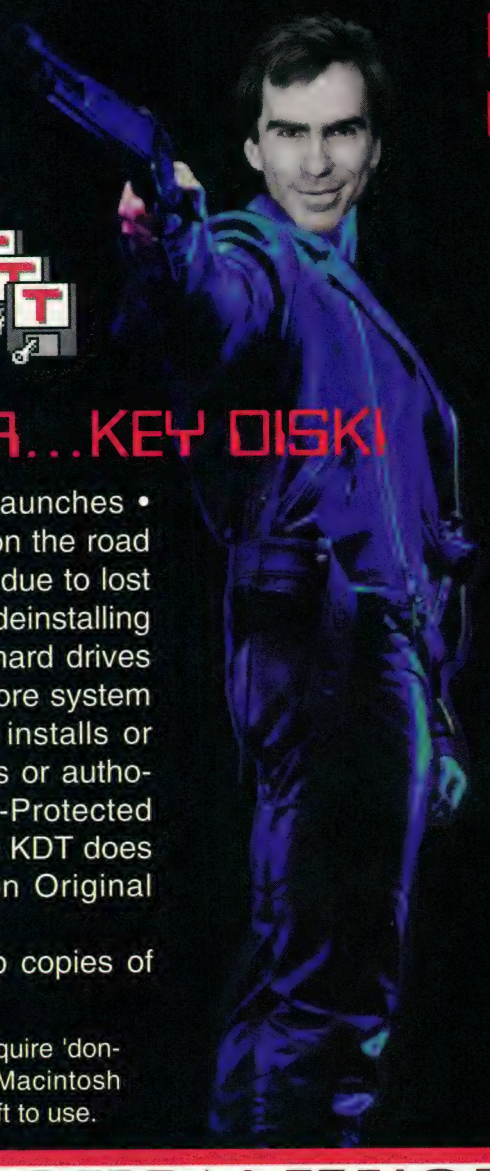

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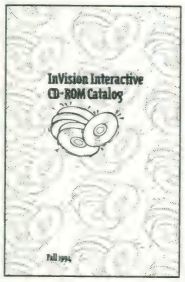

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Chicago Hope — The Operation, Part 1

JEFF RONA

Last month, we talked about how the theme music to the TV series *Chicago Hope* was created and realized. So, now that the first 47 seconds is taken care of, what about the rest of the music that must be written for the show on a weekly basis? I've been scoring *Chicago Hope* for a few months now, and I thought it would be interesting to take you through the paces I go through each week in composing and recording the underscore for the show.

Those who have read my column for a while (and I don't just mean slowly) may recall another TV series I did for a couple of years called *Homicide: Life on the Street*. The production for that show moved entirely to New York, and they wanted a more local composer on the job (I'm doing time here in Los Angeles). *Hope* is a study in contrasts compared to the schedule, musical style, and process of doing *Homicide*.

The main concern of *Hope*'s producers was for the emotional aspects of the story to come across very clearly in the music. Aside from the life and death moments in the operating and emergency rooms, much of this show is about the relationships of the main characters and how they deal with the pressures and ethical dilemmas that come up in each story. This was important to remember in devising the approach to the music. For the sake of consistency, the style and instrumentation of the main title (which I did not write, but worked very closely on with composer Mark Isham) was an important factor. Finally, there were conversations with the show's producers who, though not able to speak in specific musical terms ("I think I hear an oboe here"), had some very definite ideas of what they wanted the music to do. My job is to give the producers what they want emotionally, while using my musicianship to achieve it.

For *Chicago Hope*, that meant very little use of (dare I say it) keyboards (yikes!). As they say on MTV, this show is for the most part "unplugged." Samples and synths simply cannot convey the necessary emotion, at least not to the makers of the program. While I could certainly take a stand to the contrary, there is no point in it.

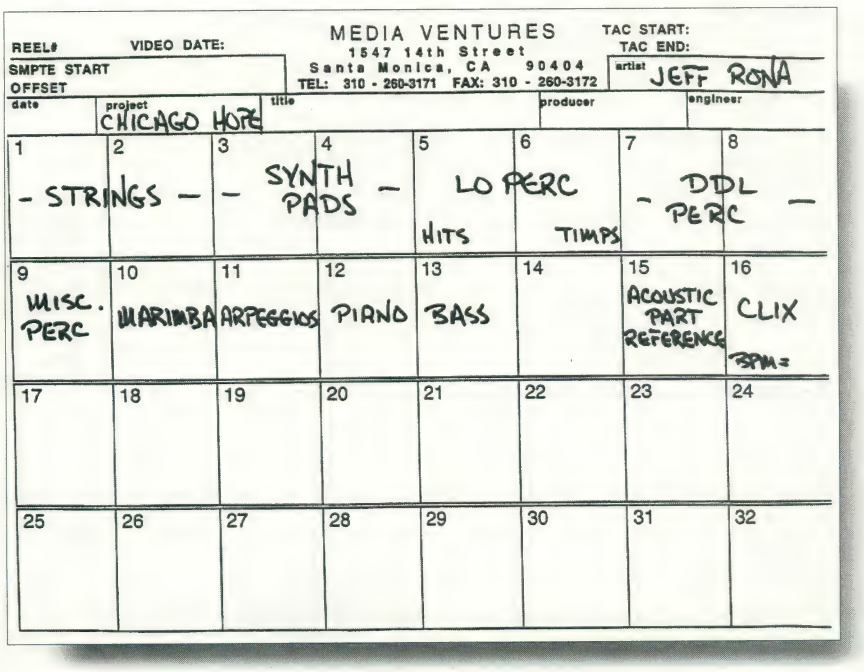

Fig. 1. Track template for the synth parts of a Chicago Hope *cue.*

Good musicians playing traditional instruments have a feel that is unique and valuable. Which is not to say I don't use my MIDI gear to its full advantage, I just do so with a light and restrained touch. The blend, about 80% live players, works well for everybody. The lineup varies from show to show depending on what I write, but the basics of the ensemble are strings (usually eight players — three violins, one viola, four celli), nylon-string "classical" guitar, trumpet, and piano. I've used woodwinds and vocals on a few episodes as well. I use my MIDI stuff for bass, percussion, synth pads, some analog-esque arpeggios, and the occasional odd tension and angst-filled weirdo sound (and boy, I love 'em). Because I deliver a demo of each cue I write to the producers for their approval, I sequence *all* the parts, including those that will eventually be played live. So I also have samples of strings, guitar, trumpet, and voice, along with my much-loved Roland MKS-20 piano module. The percussion is pretty eclectic. I created some percussion sounds on my analog synths and sampled the results. I also have loud and soft timpani, a set of orchestral percussion (gongs, cymbals, bass drum, snares, triangle), marimba, trash percussion (big hits made in an underground parking garage for maximum impact), shakers, some ethnic drums of various types, jazz brushes, and a few other miscellaneous noises. Okay, so I like percussion. I don't use them all at the same time.

I sequence everything. There's just no time, nor desire, to use paper. I hire an orchestrator to take my sequences and transcribe them for the ensemble each week. I'd do it myself, but there is no time. I create every note on the computer. Opcode Studio Vision, my sequencer of choice, prints out imperfect but useful scores that the orchestrator uses to create the final score by hand. I also give her a cassette so she can hear my articulations and dynamics, which do not get transcribed. She comes to each recording session with a score from which I conduct, along with parts for all the musicians. Occasionally she will devise some lines of her own, based on a piano or other part she hears on the tape, and throw it into the string section. These touches are often wonderful and add some spice to my arrangements. There is nothing like collaboration.

I often think that the software industry is trying very hard to convince us that with the

continued on page 120 ►

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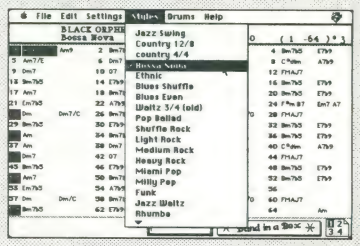

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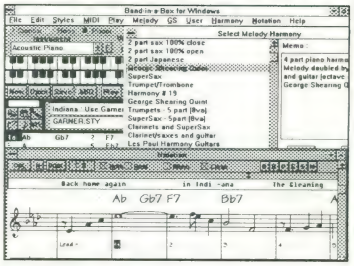

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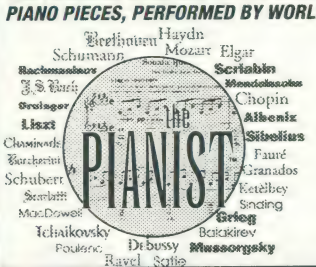

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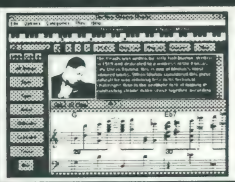

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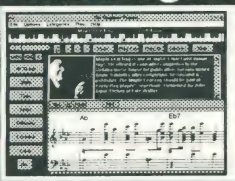

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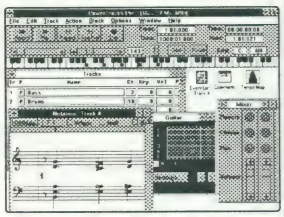

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FRED HERSCH

Stretching the Harmonic Fabric

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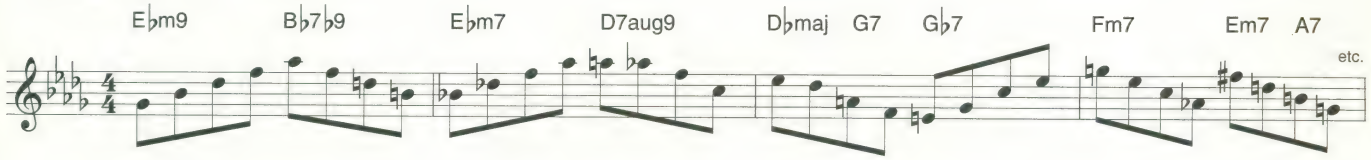
Exploring new harmonic possibilities with familiar tunes not only keeps them fresh, but also expands your knowledge of harmony and liberates you from the questionable authority of fakebook changes. One of the most effective ways to come up with your own harmonic options is to construct a "chord grid." Example 1 shows a chord grid for the first four measures of "Body and Soul." On the top line I've written the original changes, and a harmonic variation of the basic changes on each of the succeeding lines. (You needn't limit yourself to only three sets of variations,

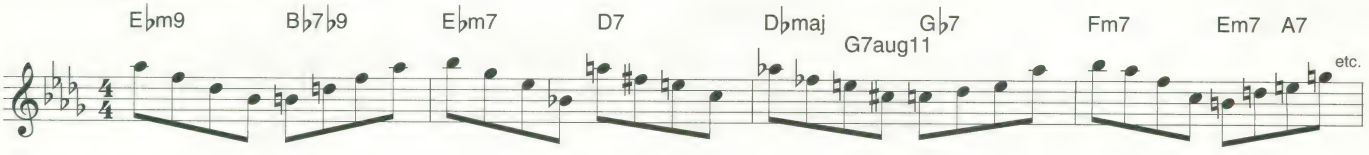
Ex. 1. The chord grid. Write the basic changes on the top line, then write as many sets of harmonic variations as you can think of underneath.

Basic Changes	E♭m7	B♭7♭9	E♭m7	A♭7	D♭M7	G♭7	D♭/F	Edim
	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
Set 1	E♭m9	B♭7♭9	E♭m7	D7aug9	D♭ G7	G♭7	Fm7	Em7 A7
	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
Set 2	A♭7sus4	A♭dim	A♭9sus4	A♭7aug11	D♭/A♭	G♭7aug11	Fm7	E7aug9
	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
Set 3	E♭m7	Ddim	E♭m7/D♭	A♭7/C	D♭/A♭	G♭/A♭	Fm7 B♭m7	Em7 A7
	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /

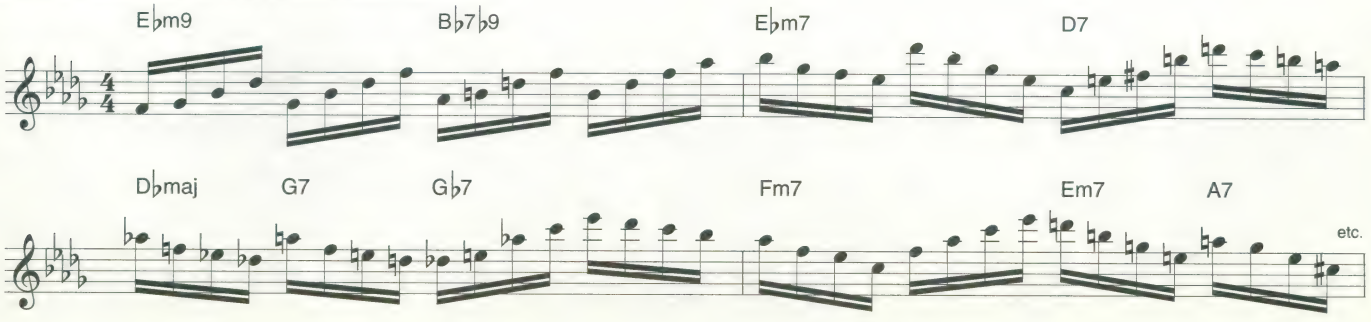
Ex. 2. Arpeggiating the Set 1 changes in eighths.



Ex.3. Set 1 changes, arpeggiating with different inversions.



Ex. 4. Up the ante by arpeggiating at the sixteenth-note level.



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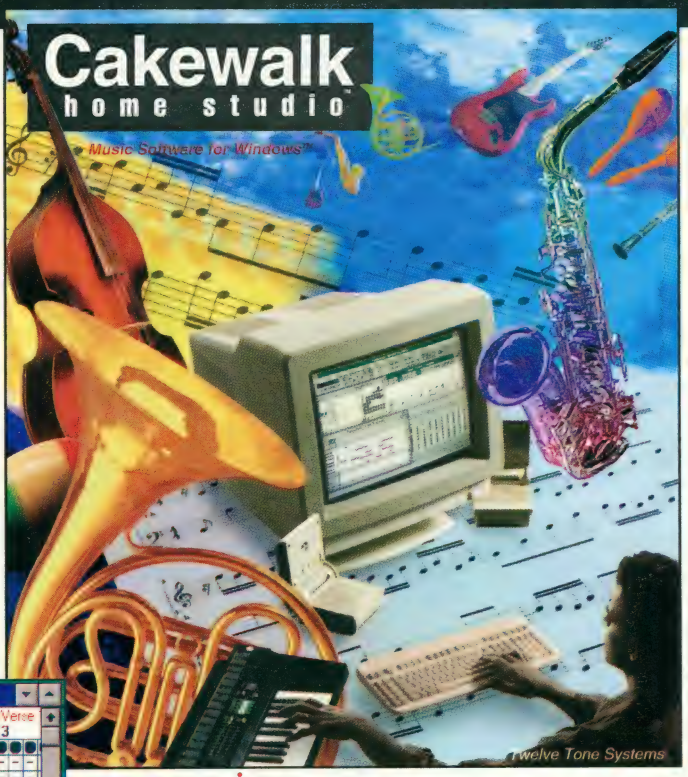

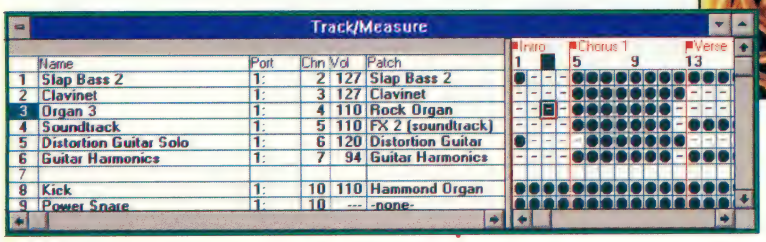

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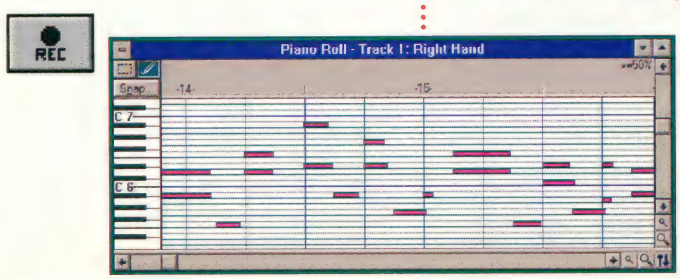

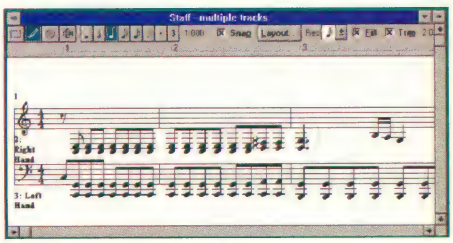

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solo piano

of course.) Start simply and work your way up to more ambitious variations.

An easy first step is to make tritone substitutions, switching a ♭II7 for a V7 chord, as in measure 2 and 3 of Set 1. Interpolating chromatically slipping sets of IIm7-V7s lends a feeling of distant harmonic motion, as in measure 4 of Sets 1 and 3. A pedal point connects a series of chord changes over a common bass note, as in measures 1, 2, and 3 of Set 2, and measure 3 of Set 3. Making a dominant 7th chord into a 9th or suspended 7th chord changes the quality of the chord, as in Set 2, measures 3 and 4.

The simplest way to apply these harmonic ideas to linear improvisation is to arpeggiate the harmonies, which will also improve your piano technique. Start with eighth-notes (see Ex. 2 and 3), and gradually work your way up to eighth-note triplets and then sixteenths (Ex. 4). Keep your left hand accompaniment sparse, play roots and 7ths or 10ths if you can reach them, to keep a relaxed flow. Arpeggiate and improvise through each set of changes from beginning to the end. Don't stop if you make a "mistake;" part of the art of improvisation, as well as part of the fun of playing, is to play yourself into a corner and figure out a way to keep going. Turn mistakes into experiments; things you've never tried before. Then mix and match sets, playing the first two bars from Set 1, the next two bars from Set 3, the next four bars from Set 2, and so on. This will sharpen your ability to thread the needle through changes.

For inspiration when seeking new harmonic frontiers, listen to pianists who have a good command of harmony, such as Tommy Flanagan, Bill Evans, Wynton Kelly, George Shearing, and Herbie Hancock, to name but a few. The study of harmony is endless, but if you discover one new way each day of getting from here to there, the applications you will find are numerous. ■

Grammy-nominated jazz pianist and composer Fred Hersch has recorded a solo piano version of "Body and Soul" on his CD, Live At The Maybeck, Volume 31 *(Concord).*

reel world

◄ *continued from page 115*

right hardware and software we can do everyone's job, from editing picture to mixing the final soundtrack. But there is no time for this in the reel world. And it doesn't allow for the wonderful symbiosis and fun of working with other talented people who do their jobs better than you might. There are exceptions to this of course — there are artists who can do amazing things on their own with enough time and resources. Some art is best when left as a personal statement by one person. Other types of art (and I use the word "art" here quite loosely), such as film and television, work because of the collaboration of a group of gifted (and I use that pretty loosely as well) craftspeople who do their respective things. The best use of technology is to assist in the collaboration process itself, so that we can exchange ideas and materials easily, regardless of our choice of tools or working practices. But I digress.

I have my template of sounds, my "orchestra," which I use each week for the score. I may add some new sounds from time to time for a special moment or new idea, but the basics are the same each time — only the notes have been changed to protect the innocent. Another constant factor is the mix. In order to make everything go smoothly, I have a "mix template" on my mixing console. For the most part, I have all the faders set in a perfectly straight line from one end of the board to the other. I make all my volume changes right in the sequencer using MIDI volume control. This way, composing and mixing the score are virtually the same thing, which is a big time-saver. I have also started to premix many of my synths when going to tape. In the past I would try to keep each instrument on its own track. I have devised a track template, which I use on every cue on every episode (see Figure 1, page 115). The synths are recorded to 16 tracks, using a pair of Tascam DA-88s. By keeping to this track layout, we can mix the music very quickly.

Once the synths are on tape, I have but to add the live musicians, and mix them all together, with only minor changes to the levels. This efficiency does not seem to compromise flexibility or sound quality, so why not?

Next month, a time line of the events that go into making these scores happen. Until then, remember: To err is human; to moo, bovine. ■

Jeff Rona is a composer and synthesist in Los Angeles. He was chairman of the MIDI Manufacturers Association for five years, and coordinates the UCLA Extension Electronic Music Program. In his spare time he has scored the music for Homicide, Chicago Hope, *and other TV shows and films.*

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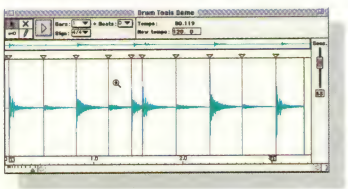

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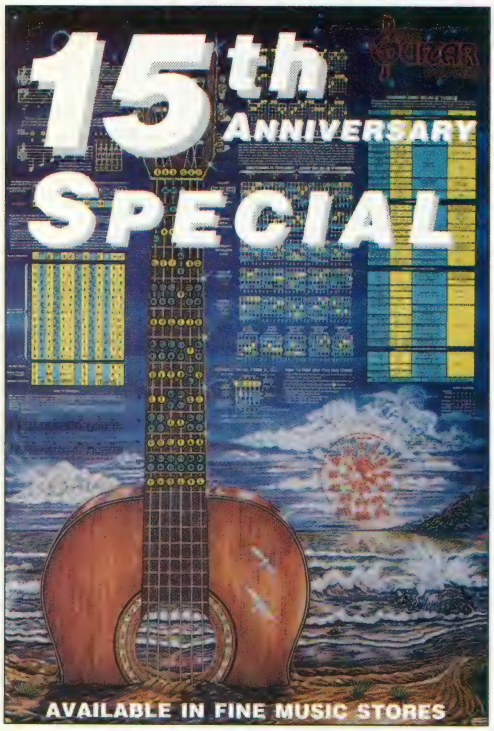

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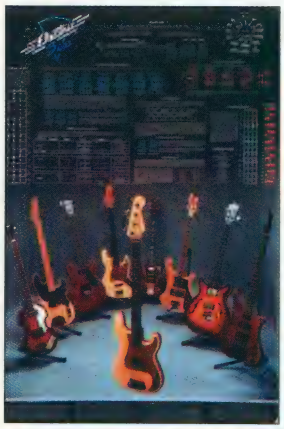

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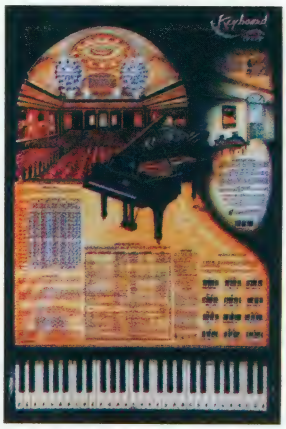

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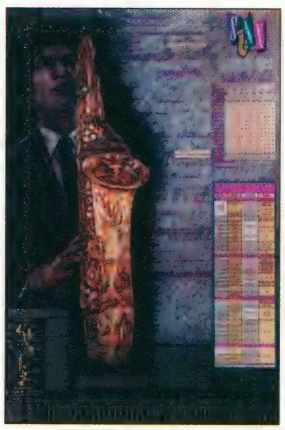

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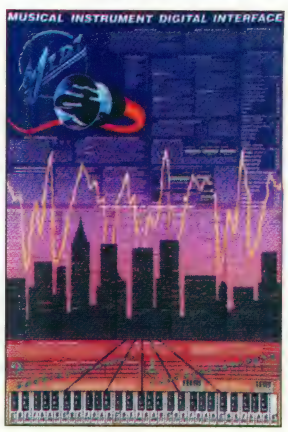

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The Radio Boogie

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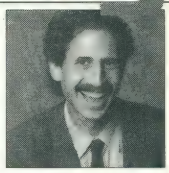
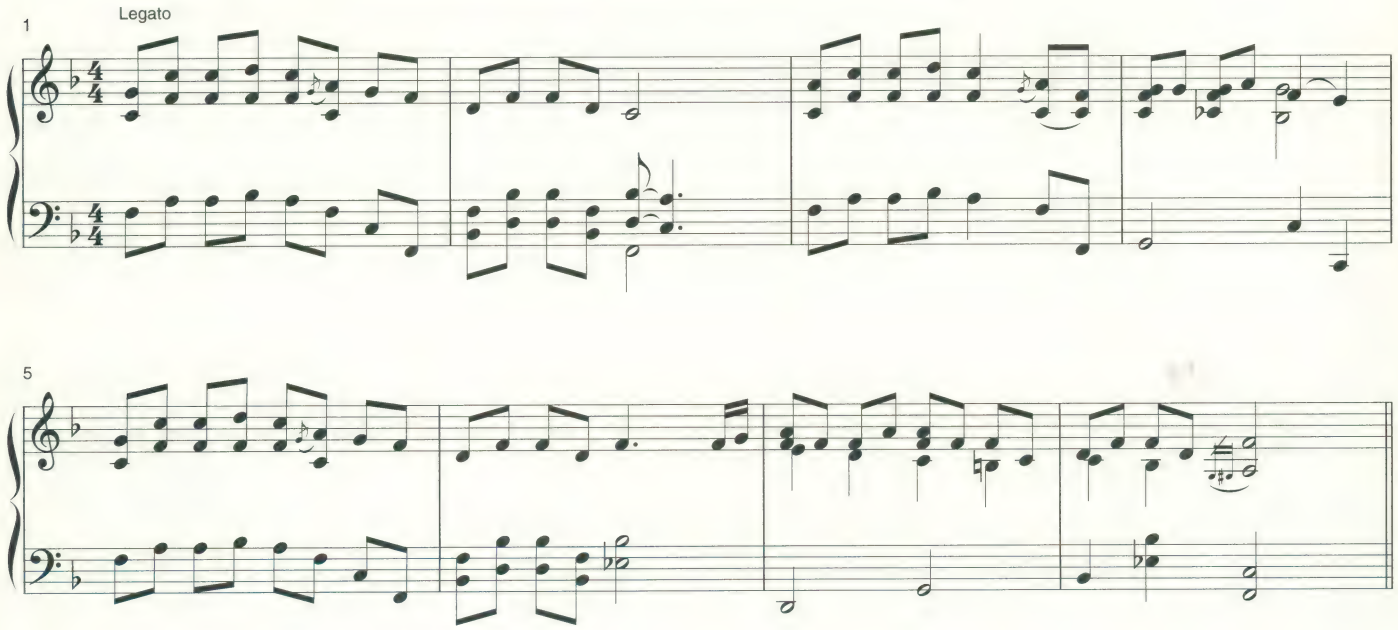


About a year ago I got a call from producers Dawn and Brian Comer. National *Public Radio* had hired them to produce a four-part radio drama based on the autobiography of their remarkable grandmother, Maggie Comer. "Maggie's American Dream" would star Ruby Dee and Ossie Davis, and was I interested in doing the score?

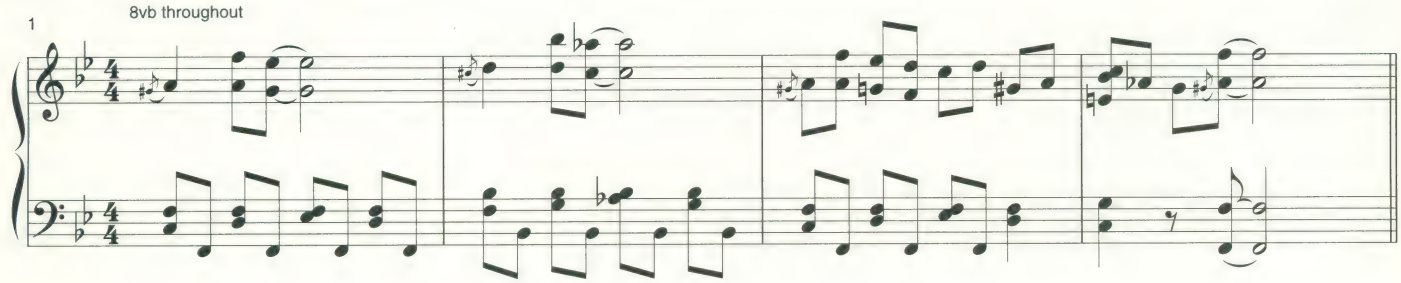
Two pages into the script I was hooked. It's a compelling story about a black woman's journey from post-slavery Mississippi to modern times — raising and educating a splendid family along the way. A challenging and worthwhile project. Plus Dawn and Brian were very open-minded about the score itself.

Because it was such a simple story — and because of budgetary and time restrictions — they'd envisioned a solo instrument, perhaps an acoustic bass, providing the entire soundtrack. As much as I love the magic of the acoustic bass, I had a few problems with this

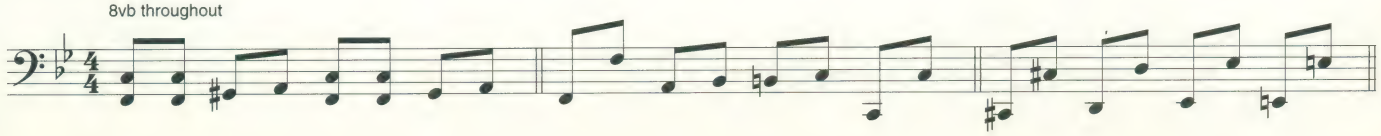
Ex. 1. In its simplicity, "Maggie's Theme" evokes a time, place, and spiritual sense by drawing upon folk and hymn styles.



Ex. 2. With variations in tempo, this boogie-style cue provided plenty of material for a number of bridges between scenes.



Ex. 3. Basic boogie basses are great raw material.



◀Continued from page 95

convolutions of the design require a bit of explanation. But surely storing patches in memory must be a simple, obvious affair.

Think again, oscillator breath. At first blush, the W7 seems to provide 256 ROM programs (which Yamaha calls "voices") and 128 RAM programs for immediate gratification. The former are divided between a General MIDI bank and a more imaginative preset bank. In fact, though, the number of programs available at any given time can be far larger, because a separate bank of 128 programs can be transferred into each song, and subsequently stored to and loaded from disk as part of the song. We found that we could have 11 songs in memory (with no notes, only programs) before the available RAM filled up. So if you need instant access to upwards of 1,000 programs at a time, or (a more likely scenario) if you play out and want the ability to rearrange your set list every night without worrying about what voices a given song uses, the W7 could be the perfect instrument for you.

Individual programs can be edited while a sequence is playing, which allows you to custom-tailor a mix very effectively. Both the song voices and the "internal" RAM programs can be edited in this fashion. If you've been editing a song voice, it will be stored to song memory when you hit the STORE button. Internal, GM, and preset voices will be stored to internal memory. You don't get to select which RAM bank (internal or song) a voice will be stored to, only the number of the memory slot.

In order to use this memory configuration effectively, you'll need to understand the limitations of the disk operating system. The internal song memory is erased on power-down, and must be loaded from disk at the start of each session — no big deal. You can save individual songs to disk, complete with their voice banks, as well as saving the bank of 128 internal RAM programs to disk. Individual programs can be loaded from disk into either internal or song memory, which allows you to assemble custom banks of programs.

With us so far? Here's the kicker: Individual programs can be loaded from disk *only* if they were saved as part of an internal bank, *not* if they were saved with a song. To complete the grim picture, there is no command for moving either a single program or a bank of them out of song memory and back into the internal bank. You can copy a bank from one song to another, but song voice memory is a dead end. Patches check in, but they don't check out. An inexplicable oversight? We sure thought so.

The intent of the design seems to be that you'll custom-design your voice bank for a given song using internal memory, and then transfer it to song memory as a last step before archiving your song. This way, a song will always have the correct sounds, no matter what's loaded into internal memory. Tweaks to song voices should be thought of mainly as a way of fine-tuning the mix, because if you should accidentally create something wonderful with a voice that's in song memory, the only way to move it individually from one bank to another is by manually copying down all the parameters with a pencil and paper.

As we indicated, this is not likely to present any problems as long as you understand not to get too wrapped up in editing song voices, and always make backups of your internal banks on disk *as internal banks*, not as part of song files.

MIDI Implementation. While not spectacular, the W7's MIDI functions are very serviceable. Each song multi comes with its own settings for master keyboard transmission — up to four zones, each with its own MIDI channel, octave transpose, and filtering for various types of control data transmission. The sequencer can record sys-ex data dumps from other instruments and store them on disk in song files. Bank select messages are supported. As already mentioned, the front panel control slider can transmit any controller number between 1 and 119. The volume footpedal can only transmit controller 7 or 11 (volume or expression); plug the same pedal into the foot controller jack and you'll get controller 4.

Conclusions. It's hard to argue with an instrument that boasts great sounds, a decent sequencer, flexible effects routings, expandable memory, basic MIDI master keyboard functions, user-friendly sound programming, and a disk drive. We would happily recommend the W7 to any keyboard player who is looking for a versatile workstation-type synth.

Its limitations are not exactly trivial: While the song voice memory is a great feature, not allowing users to extract single voices from song banks is a terrible idea. The inability to program the absolute values of important voice parameters will frustrate power users (unless they own a computer — see sidebar, page 91). The sequencer ought to chase program and volume changes when playback is started in mid-song. And we can't help wishing that it were possible to store a full complement of programmed effects with each individual patch.

But don't get us wrong: We're not saying that the W7 is badly designed, or that it's strictly an entry-level "beginner" instrument — not by any stretch of the imagination. A working club band keyboardist or a home studio owner whose musical ambitions are bigger than their budget could find the W7 a potent resource, and its forward-looking design points the way toward an exciting future for electronic music. In a word, Yamaha has another winner on their hands. ■

idea. First, Maggie's story had a tremendous emotional range, and I was concerned that the bass lacked the necessary dynamism. Second, I knew that a lot of people listen to radio in their cars, where the road noise would wipe out the subtleties of the bass. Finally, I'm a keyboard player, and I suspected that in the crunch of high-pressure post-production I'd be more authoritative writing for the ivories. I decided to follow my suspicions, and went for the keys.

I began the first step of any scoring project: sitting down with everyone involved and figuring out what the story needed, emotionally. In this case it needed warmth, since it was a touching family story. It needed a sense of place, since it was about black culture in the rural South and urban North. And it needed a sense of scope, which in this case was a kind of timelessness.

So there I had it: warmth/place/timelessness. I dug into the text. I immersed myself in turn-of-the-century Mississippi and Roaring '20s Chicago. I listened to music of the time and place and then I sat down and wrote a whole bunch of themes.

My favorite was a piece called "Maggie's Theme" (Example 1). If you take 23 seconds to play through it, you'll see that the folksy melodic material recalls "Oh, Susannah." But the piano setting gives it a hymn-like quality. There was a lot of pain and gentle triumph in the story and I wanted the theme to reflect this seriousness. So I exercised some composer's options to sidestep the inevitable diatonic cadence and go for a Copland-esque moment of poignancy.

Measures 6 and 8 are a good example of how a tiny harmonic shift can put a nice spin on an otherwise predictable moment. The final cadence could easily have been a typical V to I. But the change in the bass note from *C* to *E*♭ takes it to a completely different place emotionally. This is the sort of thing that abounds in Randy Newman's early stuff. Check out his solo piano and voice album, *Sail Away*. It's a kind of "Well-Tempered Clavier" for keyboard-based songwriters. We're all so used to using familiar chords as building blocks that we must remember to send our fingers to unfamiliar locales.

But I digress. I played my three top themes for the producers and, to my relief, they chose "Maggie's Theme" as their favorite. A word about choices: I only give my clients choices if I'm comfortable with all the options. Very often a producer or director will hear something in the music that I don't and my backup choices will help steer me in the right direction. Hell, music ain't brain surgery. If your family, your dog, and the cable guy all hate Piece A and love Piece B, then you should probably go with Piece B. Unless you've got an incredibly powerful gut feeling. But that's another column.

Dawn and Brian went off to KQED in San Francisco and recorded and cut all four one-hour segments. The following Friday they called, tired but excited about their show. It was ready for scoring. Could I possibly have the finished music by . . . er . . . um . . . Wednesday? A four-

hour score written and produced in four days? Ordinarily, this is where my head would have exploded, but Dawn and Brian had committed the unpardonable sin of being really nice folks, and I would basically have done anything they wanted. Musically.

Immediately I went out and bought a large supply of fruit juice and striped my multitrack with SMPTE code. I've found the most convenient way to score radio accurately is to lay down the voice and SFX and lock the sequencer up to the voice track — the same way you'd score TV or film. The difference is that you don't actually see the SMPTE code numbers underneath the action, so it's a little harder than scoring to picture. On the other hand, you're not scoring action, just words, so it's a little easier than scoring to picture. Whatever. This is the best way I've found. If you've got a better way, write a letter to the editor.

Next I chose my piano. Actually, sampled piano. I'd considered replaying everything on a real grand but the production crunch intervened. So I listened to literally every sampled piano sound that existed in our universe at the time, and for this style settled on my tried and true Kurzweil 1000 PX with just a pinch of room reverb. I wrote and recorded to sequencer and on the final day mixed all my cues to DAT.

It was pure pleasure. For one thing, the show itself was well written and acted, so I was duly inspired. Also, I could produce the final product as I wrote it. Fast! I didn't have to write out parts for other players, or book studio time or even hunt for that killer brass patch. It was all my beloved piano. Talk about your instant gratification.

Still, it was a four-hour show and I had to come up with dozens of little bridges between chapters and a myriad of substantial cues, and I found myself using more and more (gulp) boogie-woogie. An absolute gold mine for solo piano scoring in a period style, it works well at any tempo, and as long as I didn't clutter up the right hand too much, it was acoustically transparent. The final mixer, therefore, could keep the music hot and still have the voice come through loud and strong.

"The Boat" (Example 2) is a four-bar example of the kind of blues/boogie that saved my butt. I used an up-tempo version of this to score a wild boat ride, a slow version to score a sad departure, and a mid-tempo version for the end credits. For your delight (and possible rescue) I've included three of my favorite boogie-woogie left hands (Example 3). Try them swung, straight, and with different harmonies superimposed on top. Then, if you have the opportunity, play them in a steamy New Orleans bordello at four in the morning. ■

As a composer and songwriter, Richard Leiter has done projects for a wide variety of clients, NPR, Honda, Carl's Jr., CBS and Inglenook Wines, among others. He writes and performs in California.

◄ Continued from page 9

work of Tom Jung, president and chief engineer of dmp records? Tom is a pioneer in the field of digital recording and is widely recognized for his "no compromise" sound quality. He recently engineered a session with an acoustic jazz trio entirely on the ProMix 01, using only the mixer's onboard features. Since the proof is in the mix, your readers can receive a free CD of this session by calling (800) 937-7171, ext. 450.

But the best way for readers to appreciate the ProMix is at their local authorized Yamaha dealer. Not only will they hear first-hand how sonically clean the ProMix 01 is, but they will also have an opportunity to get under the hood and see how much unprecedented audio processing power is now so affordable to all music professionals. The fact is, we simply can't fill ProMix 01 orders fast enough.

Michael MacDonald
Marketing Manager
Yamaha Professional Audio
Buena Park, CA

From the sound of your review, the Yamaha ProMix 01 seems to have some very serious noise floor problems. Yet every other review of the ProMix I've read seems to agree with all the shortcomings you listed, except for the noise problem. Could it be that the unit you tested needed repair? Did you approach Yamaha with your findings? With all the competition out there for mixers in this price range (and lower!), it seems odd that Yamaha would produce a poor-sounding unit and hope that customers would overlook this flaw.

Roger Savoie
Internet

[*Yamaha sent several product experts up to our test lab before the review went to press. We re-ran our audio specification tests specifically for their benefit. At that time they were unable to find a flaw in our test procedures.*]

I was very surprised by your review of the Yamaha ProMix 01. We've had considerable experience, and no problems, with the board in critical audio applications. Whenever setting up new equipment, we always experiment with gain structure to maximize the system's potential. We used an approach with ProMix that's consistent to all our digital gear: maximizing peak input gain close to the limit of the A/D converters for optimum resolution in the digital domain. Our results have been slightly better signal-to-noise than a popular analog studio mixer, and excellent sonic quality with no edge or harsh-

Continued on page 128 ►

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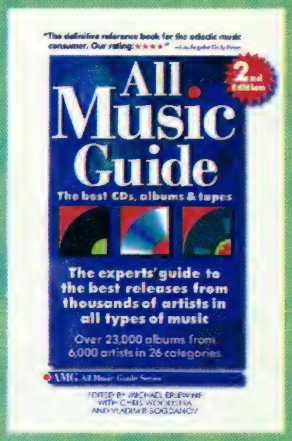

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◀ Continued from page 126

ness. We experience no noise from the effects returns (generally, effects exhibit some noise at the output stage), but slight noise is added when effect sends are brought up to unity. This was more noticable on modulated effects, though this was determined at output levels way above normal operating conditions and represented excessive effect levels which would rarely be used. In other words, ProMix performed to our best expectations.

Ira White
Studio Street
Virginia Beach, VA

Hyman's Jazz

Your interview with Dick Hyman [Jan. '95] was worth the price of a year's subscription in itself. Hyman is everything a musician should be: He knows music, he knows the history, he can play, and he can explain it. He's done everything, yet he's refreshingly modest. And please note: He didn't use any vulgarity. To think that this inhibits him in any way (as some of your other interview subjects and letter writers seem to believe) is laughable. A classy guy like Hyman doesn't need to swear.

Mark Stivers
Sacramento, CA

Tax Strategies

Your article on tax strategies for musicians [Jan. '95] was in some respects inaccurate, as shown in this passage from page 331 in the 1994 edition of *How to Pay Zero Taxes*, by Jeff A. Schnepper: "In *Drucker et al. v. Commissioner*, 52 AFTR 2d 83-5804, . . . the Second Circuit Court of Appeals allowed concert musicians home office deductions for the business use of their apartments because they spent most practice time at home and their employers did not provide the musicians with space for the essential task of private practice."

Michael Hennessy
Hyannis, MA

Keyboard On-Line

As I contemplate going to the trouble to Mosaic my way in your direction, I can't help but hope that I will find more for my time and expense than sound companies advertising their products and rehashes of stuff from your magazine at your Web site. Putting in the winners of the tape competition is an excellent idea, though.

As a general comment regarding the 'net, it seems that so much of the on-line stuff is obsessed with itself as its primary content, or overly fascinated with just the fact of being on-line. Perhaps all the tech-heads who spend all this time and technology downloading MIDI files of your lessons examples would find their time better spent at their instrument — a *keyboard*, as in the name of the magazine. Now, if there was only a program you could download that would run Hanon exercises for you. . . .

Rick Krizman
Internet

Corrections

[Our apologies to Vince Brown of Positive Image Studio, whom we failed to credit as photographer with the article on Roadpig, which ran in our Nov. '94 issue. Ditto to Mark Brett for his photo of Bloodline's Lou Segreti, which ran in Oct. '94. Also to Martin Howard Naylor for printing the wrong contact number for his company, Sorcerer Sound Productions, in the Jan. '95 Interface. Sorcerer Sound can be reached by dialing (011-44-85) 829-9203. Finally, to all of you who have been trying to access the Keyboard *web site via the incorrect codes published in Dominic Milano's From The Editor column in the Feb. '95 issue. Please note that "http:www.mfi.com/keyboard" should read as "http://www.mfi.com/keyboard," and "ftp mfi.com/keyboad" should read "anonymously FTP ftp.mfi.com in the /pub/keyboard/patches directory."]* ■

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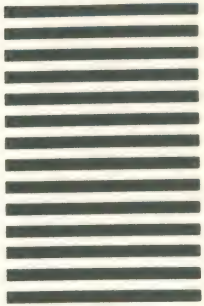

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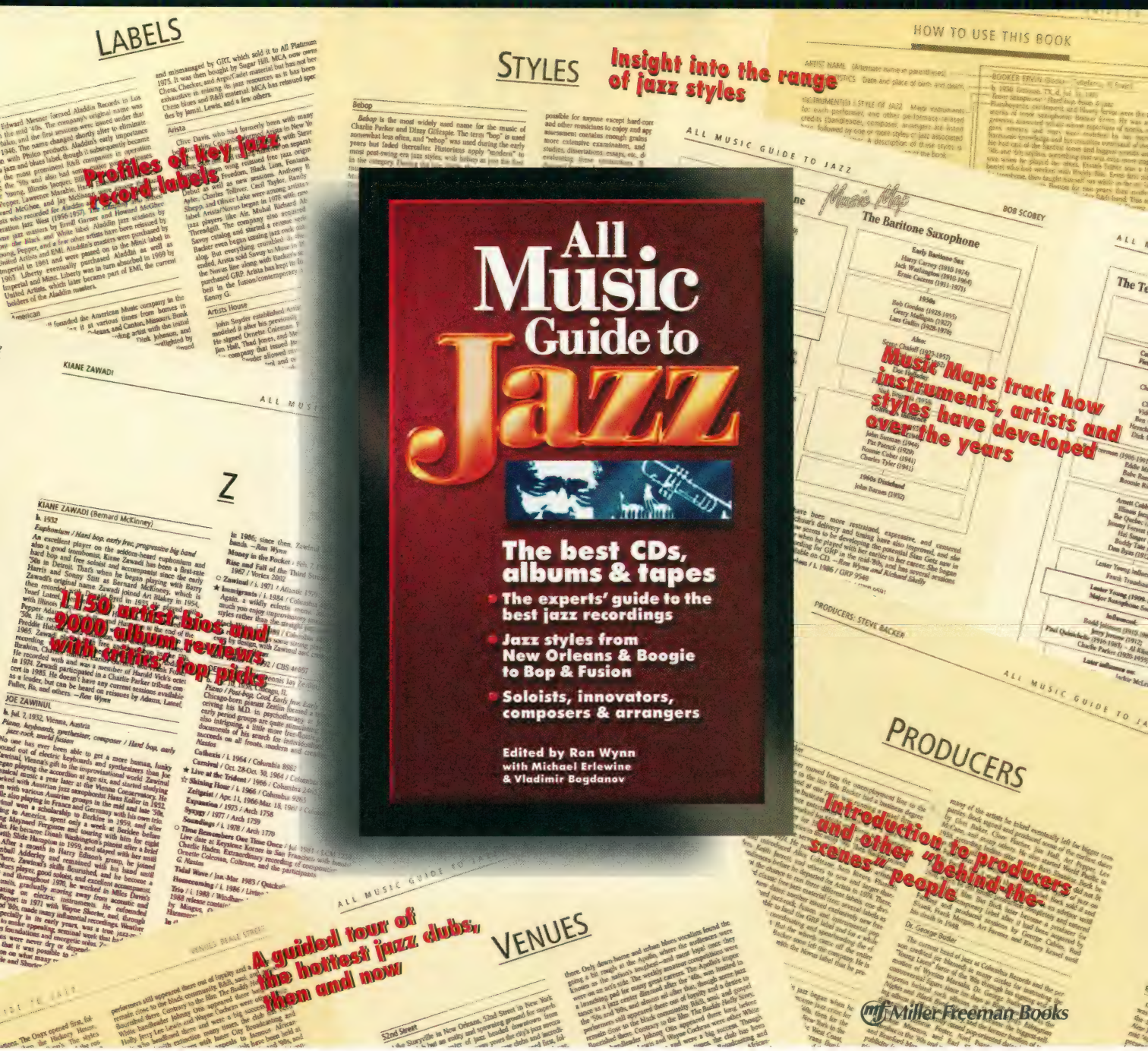

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KM03

Spring Cleaning Edition

TITUS LEVI

Name: Mark Mercury. **Style:** "serious music." **Contact:** 936 N. Lucile Ave., #2, Los Angeles, CA 90026.
"Serious music"? Scary is more like it. Mercury has composed for everyone, from B-movies like *Supervan* to kid shows like *Doctor Snuggles*. He's scored for the class of PBS (the theme for *Videolog*) and the trash of NBC (*Santa Barbara*), and done arranging and coproducing for two totally opposite spirits: Bill Cosby and Captain Beefheart. Left to his own devices, Mercury creates the most unsettling, creepy, spooky music I've heard in a long time. Even the prettiest moments seem to mask something terrifying. If you're looking for something to get you in the mood next Halloween, look no further.

Name: Bill Rust. **Style:** Bach meets Booker T and the MGs. **Contact:** 21 Ann St., #A-21, South Norwalk, CT 06854.
A crisp blend of Baroque and funky boogie. Just the sort of thing to play during a long drive down a coastal highway.

Name: Bill Turner. **Style:** jazz, rock, pop. **Contact:** Box 4104, Huntington Beach, CA 92505.
An infectious stew of folksy piano, feel-good arrangements, and intelligent melodies and rhythms. If you melded Lyle Mays to Bruce Hornsby, you might get something this pleasing.

Name: Ellsworth Hall. **Style:** progressive rock, jazz/pop fusion. **Contact:** 1207 Overbrook Rd., Baltimore, MD 21239.
This music grows out of the Euro-electronic concept albums of the '70s, but by sticking close to the soundtrack idea, Hall avoids some of prog's tendencies to overreach. Occasional dry patches lead to brittleness, but most of the music is quite vibrant.

Name: Roger Gravel. **Style:** new age. **Contact:** All-Star Productions, Box 245, Place Du Parc, Montreal, Quebec, H2W 2N8 Canada.
Gravel marries the sweet, dreamy, ear-pleasing textures of new age to the hypnotic, cycling melodies of minimalism. Animated by strong melodies and subtly complicated harmonies, this sumptuously produced music offers layers of mellifluous tones and hours of musical discoveries.

Name: Bob Willey. **Style:** new age. **Contact:** Box 17594, San Diego, CA 92177.
Armed with a doctorate from the cutting-edge electronic music program at the University of California's San Diego campus, Willey serves up a classic new age brew on his CD, *Peace Pieces*. The sheer beauty and careful programming of his music makes this worth a listen.

Name: Travis Charbeneau. **Style:** metal synth. **Contact:** 3426 Stuart Ave., Richmond, VA 23321.
Though uneven, Charbeneau's music can be powerfully driven when focused and tightly arranged into a fusion of guitar soling with driving keyboard accompaniment.

Name: The Sound Castle (*i.e.*, the Mazzei family, w/ mother Edith, brother Michael, and sisters Francine, Therese, and Loretta). **Style:** Christian new age. **Contact:** 1142 Nevada St., Pittsburgh, PA 15218.
A fresh approach to spirituals and contemporary Christian music, as well as carols, hymns, and other traditional fare. The Mazzeis are at their best when combining subdued synth atmospheres with warm and natural vocals in rich harmonies. Their music is collected on a self-produced cassette, *Sacred Songs and Hymns*.

Name: Edu Helou. **Style:** new age. **Contact:** Av. Juriti 563, São Paulo, Brazil, CEP 04520.
This music won't surprise new age audiences. It will, however, delight the ear with a disarmingly beautiful panoply of electronic textures.

Name: Barry Dean. **Style:** pop/rock. **Contact:** 4106 S. 130th E. Pl. 1801, Tulsa, OK 74134.
Straight-ahead, hit-maker pop music, with more than a hint of blue-eyed soul. Sure, they're love songs, with accents on two and four and fewer than a dozen chords per song. So what? This is smart and expressive pop music.

Name: Thomas Hackl. **Style:** electronic. **Contact:** 126 Archer St., Roseville, NSW 2069, Australia.
Hackl's CD *Terra Australis* is a musical reflection of his homeland. At times, it's mysteriously sparse, with only a few fragments of melody, synth sweeps, and drones. On other tracks, the gentle reflective mood prevails, joined now and then by hummable melodies and a backbeat. Most of his work dodges between these poles to create a dreamlike impression — appropriate for Australia, where the Aboriginal creation tale is called *The Dreaming*.

Name: Kid Bacchus (David Thomas Peacock). **Style:** "postmodern dysfunctional rock and roll." **Contact:** 3225 Netherland Ave., Riverdale, NY 10463.
Hard-driving, slightly angular music from an unlikely mesh of artsy pop, new wave, and hard rock. Elements of blues and funk, beautifully rendered by guitarist Dave "Buzz" Ramsay, mingle with dark, jagged electronic washes and rock-steady drums.

Name: Bob Czina. **Style:** electronic. **Contact:** Czina Music, 40 Katherine Pl., Oakdale, NY 11769.
Thoughtfully conceived and well-crafted compositions that pull from a variety of styles: classical, jazz, and new age. Czina's album, *On Solar Winds*, draws these diverse roots into a coherent, engaging series of pieces, which move the concept forward with simple but charming melodies.

Name: Michael West. **Style:** symphonic rock. **Contact:** 6 White Beech Dr., Trenton, NJ 08618.
West hits the prog rock trail on his *God, Sex, Money* cassette, revitalizing its thematic approach with a richly textured, hard-driving feel. This is high-energy, big-beat rock, with blazing, cranked keys and expansive (the pieces average about ten minutes) arrangements.

Name: Alstrom Inc. **Style:** jazz fusion. **Contact:** 31 Cortland St., Roseland, NJ 07068.
This music has the gregarious radiance and polyrhythmic character of a Brazilian carnival celebration wrapped into a jazzy package. Very sexy, very upbeat.

Name: Phil Calico. **Style:** electronic concept pieces. **Contact:** 207 Elm St., New Rochelle, NY 10805.
The titles of Calico's suites/albums show his interest in unified themes: *Seven Deadly Sins*,

discoveries

Solar Sounds, Song of the Gods. These collections and others are cousins to concept rock and electronic music from decades past. But Calico updates the music with fresher forms, mostly new age but also with a leaning toward hard-rocking and funky grooves that join bright, airy synth patches.

Name: Greg McGuirk. **Style:** electronic progressive new age rock. **Contact:** Box 501305, Indianapolis, IN 46250.
Drummer John Wittmann's super-clean sound and McGuirk's artful take on synthesized percussion licks are a match made in heaven. The tandem provides the reflective feeling of the best new age while capturing the catchiness of rock, with a fair bit of jazz thrown in for spice.

Name: Wayne Scott Joness. **Style:** new age. **Contact:** 12621 Sarah St., Studio City, CA 91634-1116.
Joness combines searing jazz solos, Baroque counterpoint, rocking guitar lines, and dreamy moods, gracefully linked by outstanding arranging skills.

Name: Dialogue (Robert Reed, Scott Guenther-Lee). **Style:** new age rock. **Contact:** 14501 Berkshire Dr., Independence, MO 64055.
This pop band uses synths for backing textures, harmonies, and punctuations. The usual, right? Not exactly. This duo stakes out their turf between new wave's introverted disaffection and new age's tenderness. Their cassette, *Definite Purpose*, contains an album's worth of potential.

Name: Marc Vanocur. **Style:** new age. **Contact:** 18227 Domino St., Reseda, CA 91335.
Heavily jazzed-up new age, with some snappy, wonderfully syncopated piano solos and synth backing tracks, along with a bent-out, looped sample of "I'm melting!" It's rare and welcome to hear new age music swing this hard. ■

Titus Levi, founder of the California Outside Music Association, spends his free time struggling through graduate economics courses at U.C. Irvine. If you'd like to appear in Discoveries, send a cassette or a CD of your best material, a letter indicating your full name, age, style, influences, performance credits, goals, and equipment, a publishable phone/fax number and address at which readers may contact you, and a clear black-and-white photo of yourself with your keyboard setup. Photos should be labelled with your name and the photographer's name and address. All styles of music will be considered. Due to number of submissions, material cannot be returned, and applicants will not be contacted unless accepted. Send all correspondence to Titus Levi, 5153 Hanbury St., Long Beach, CA 90808. Titus also invites Discoveries alumni to keep in touch with news about career advances.

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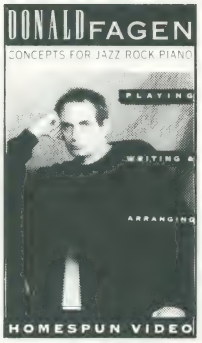

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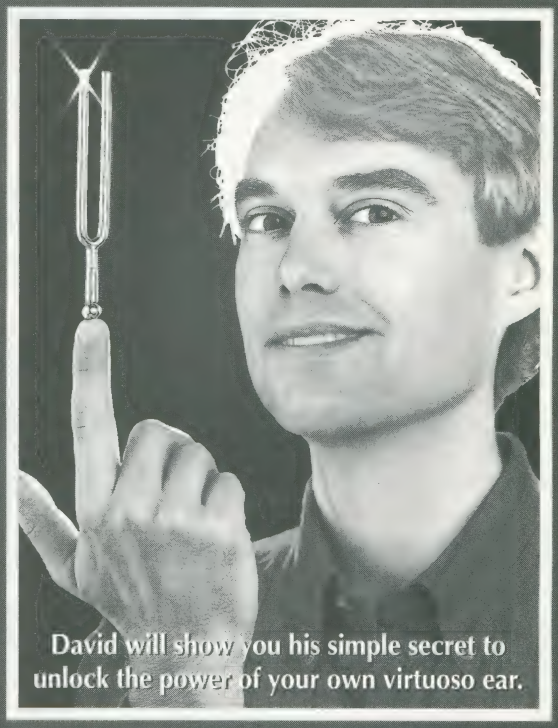

by David L. Burge

IT ALL STARTED in ninth grade as a sort of teenage rivalry.

I would slave at the piano for five hours daily. Linda didn't practice anywhere near that amount. But somehow she always seemed to have an edge which made *her* the star performer of our school.

It was frustrating.

What does she have that I don't? I'd wonder.

Linda's best friend Sheryl sensed my growing competition. One day she bragged on and on about Linda, adding more fuel to my fire.

"You could *never* be as good as *Linda*," she taunted me. "*Linda's* got *Perfect Pitch*."

"What's Perfect Pitch?" I asked.

Sheryl gloated over a few of Linda's uncanny abilities: how she could name any tone or chord *—just by ear*; how she could sing any pitch she wanted—*from mere memory*; how she could play songs after only *listening* to them on the radio!

My heart sank. *Her fantastic EAR is the key to her success* I thought. How could I ever hope to compete with her?

But later I doubted Sheryl's story. How could anyone possibly know F♯ or B♭ just by *listening?* An ear like that would give someone a mastery of the *entire musical language!*

Yet it bothered me. Did Linda *really* have Perfect Pitch? I finally got up the nerve and point-blank asked Linda if the rumors were true.

"Yes," she nodded to me aloofly.

But Perfect Pitch was too good to believe. I rudely pressed, "*Can I test you sometime?*"

"OK," she replied cheerfully.

I couldn't wait to call her bluff...

My plan was ingeniously simple: I picked a moment when Linda least suspected it, then boldly challenged her to name tones for me—*by ear.*

I made sure she had not been playing any music. I made her stand so she could not see the piano keyboard. I made certain that other classmates could not help her. I set everything up perfectly so I could expose Linda's Perfect Pitch claims as some kind of ridiculous joke.

Nervously I plotted my testing strategy. Linda appeared serene. Then, with silent apprehension, I selected a tone to play. (She'll *never* guess F♯!)

I had barely touched the key.

"F♯," she said.

I was astonished.

I played another tone. She didn't even stop to think. *Instantly* she announced the correct pitch.

Frantically, I played more and more tones here and there on the keyboard. But each time she would somehow know the pitch. She was SO amazing. She could identify tones as easily as *colors!*

"How in the world do you do it?" I blurted. I was totally boggled.

"Sing an E♭," I demanded, determined to mess her up.

With barely a pause she sang the proper pitch. I had her sing tone after tone (trying hard to make them increasingly difficult). But as I checked her on the keyboard, I found that she sang each note perfectly on pitch.

I was totally boggled. "*How in the world do you do it?*" I blurted.

"I don't know," she sighed. And to my dismay, that was all I could get out of her!

The dazzle of Perfect Pitch hit me hard. My head was dizzy with disbelief, yet from that moment on I knew *Perfect Pitch is real.*

I couldn't figure it out...

"*How does she DO it?*" I kept asking myself. On the other hand, why can't *everyone* recognize basic musical tones by ear? It dawned on me that most people can't tell a simple C from a C♯, or the key of *A major* from *F major*! It seemed so strange that a *musician* would not know tones—like a painter who doesn't know colors! Or a mathematician who can't recognize numbers! Or an English teacher who cannot identify a dangling participle!

I found myself even more mystified than before. Humiliated and puzzled, I went home to work on this intriguing problem. At age 14, this was a hard nut to crack.

You can be sure I tried it myself. I would sweet-talk my three brothers and two sisters into playing tones for me, then I'd try to guess each pitch by ear. My many attempts were dismal failures.

So I tried playing the tones *over* and *over* in order to memorize them. I tried to feel the "highness" or "lowness" of each pitch. I tried day after day to learn and absorb those elusive tones. But nothing worked. I simply could *not* recognize the pitches by ear.

After weeks in vain, I finally gave up. Linda's Perfect Pitch was extraordinary—a prized trophy of talent and virtuosity. But for me, an ear like that was way out of reach.

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Then it happened...

It was like a miracle. A twist of fate. Like finding the lost Holy Grail.

Once I had stopped *straining* my ear, I started to listen NATURALLY. Then the incredible secret to Perfect Pitch jumped right into my lap.

I began to notice faint "colors" within the tones. Not *visual* colors, but colors of *pitch*, colors of *sound*. They had always been there. But this was the first time I had ever "let go"—and *listened*—to discover these subtle differences within the musical tones.

Soon—to my own disbelief—*I too could recognize the tones by ear!* It was simple. I could hear how F♯ sounds one way, while B♭ has a *different* sound—sort of like "listening" to red and blue!

The realization struck me: THIS IS PERFECT PITCH! This is how Bach, Beethoven and Mozart could mentally envision their masterpieces—and name tones, chords and keys all by ear—*by tuning in to these subtle "pitch colors" within the tones.*

It was almost childish—I felt sure that *anyone* could unlock their own Perfect Pitch by learning this simple secret of "color hearing."

Excitedly I told my best friend Ann (a flutist) that *she* could have Perfect Pitch too.

She *laughed* at me.

"You have to be *born* with Perfect Pitch," she asserted, believing that somehow I always had it.

"You just don't understand how Perfect Pitch works," I countered. "Not long ago I couldn't recognize one note. Now it's *easy!*"

I showed her how to listen. Timidly, she confessed that she too could hear the pitch colors. From this simple discovery, it wasn't long before Ann had *also* acquired Perfect Pitch!

We became instant school celebrities. Classmates loved to test our abilities, leaving everyone awed and amazed by the power of our virtuoso ears. Everyone was fascinated with our "supernatural" abilities, but to us it was normal.

Way back then I did not know the impact I would have when years later I explained my discovery to college music professors. I was surprised that many of them *laughed* at me at first. You may have guessed it—they told me, "One must be *born* with Perfect Pitch." Yet once I revealed the simple *secret* to Perfect Pitch—*and they heard for themselves*—you'd be surprised at how fast they would change their tune!

As I continued with my own college studies, my Perfect Pitch ear allowed me to progress far faster than I ever thought possible. I even *skipped over* two required courses. Perfect Pitch made *everything* easier—performing, composing, arranging, sight-reading, transposing, improvising—and it enhanced my *enjoyment* of music as well. I learned that music is definitely a HEARING art.

And as for Linda?

Oh yes—I'll have to backtrack a little. Time eventually found me at the end of my senior year of high school. I was now nearly 18. In the four years since I had acquired Perfect Pitch, my piano teacher insisted I had made ten years of progress. But I was still not satisfied I had truly beat out Linda. Now it was my *final chance* to prove myself.

Our local university sponsored a music festival each spring, complete with judges and awards. To my horror, they scheduled me as the last person to play—the *grand finale* of the entire event.

Linda gave her usual sterling performance. It would be tough to match, let alone surpass. I went for it. Slinking to the stage, I sat down and played my heart out.

Guess what? I scored an A+ in the most advanced performance category.

Linda only got an A.

Sweet victory was music to my ears—mine at last!

Now it's YOUR turn!

These days, thousands of musicians around the world and research at two universities have also proved my Perfect Pitch method (info on request).

Now I'd like to show YOU how to experience *your own* Perfect Pitch! To start, you need only a few basic instructions. I've had lots of fun revealing my method in my **Perfect Pitch® SuperCourse**. *It's easy*—and you don't have to read music! It's also *guaranteed* to work for YOU—regardless of your instrument, your playing style, or your current ability level.

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Please—don't *you* laugh, too! At least not until you give me a *chance* to formally introduce you to *YOUR VERY OWN* Perfect Pitch!

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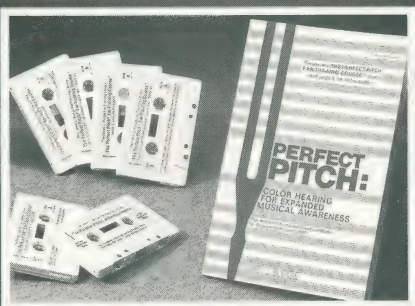

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◄ *Continued from page 144*

didn't actually feel he belonged to?

Four decades later, that's what. The account is coming due, and from this angle the price looks too high.

From his father's death to his 40th year, he overtly fought the world and covertly fought the one person no son can ever really "defeat": his own mother. By the time I was born he had lost both struggles. He had given in. With nothing to measure himself against except other people's possessions, with no purpose of his *own* in life, his spirit died hard, leaving his mind and body behind to walk through the motions.

Now he is 80. Emphysema riddles his lungs. Arthritis pains his joints. The mother he became mock-husband to is emotionally and mentally lost to him, just a bitter tape loop cutting him from her nursing home bed. The wife he could never really love is content; she finally has him to herself. The sons he could never really understand put up with him from their varying emotional and physical distances, with the one he cared for the most, me, now 23 years lost to him on the far side of the greatest gulf of all. As for himself, he has absolutely nothing. He is hollow. Tap his heart and you can hear the echoes.

Part of the family mythology is that this is not a sad picture. I don't buy it.

The little boy sleeping behind me has lost a father, too — to divorce, not disease, and in his case it might turn out to be the best thing that could ever have happened, because his bio-dad has the sensitivity and perception of a strip mine. Were he part of this boy's life for more than occasional weekends, he might do him serious harm. This way is better. It leaves room for a changing cast of surrogates, each appropriate to a given situation, who will collectively provide this sleeping boy with the most important thing that fathers ever give their children: the measure by which they know their own growth.

Mothers give you the world. They hold and feed you in their womb while you build yourself, cell by cell, and then they release you into the universe you have come to see. Forever after they are your emotional source, your channel, your starting point. No matter how troubled your relations with your mother may become in life, no matter how much you rebel, you can never go all the way. Whether you remember it or not, you have shared too much. Whether you can feel it or not, deep inside you are not discontiguous souls. You overlap.

Not so with fathers. Like it or not you are born coming to them, not from them, a polarized relationship by whose magnetism you will guide your life. This distance is necessary because all children are necessarily in competition with all fathers. Put aside Freudian concerns. This cuts across gender. Male or female, your job as you grow up is not to rebel and prove your father wrong, but to rebel *and prove him wrong in part,* building a new, better place from which your own children can fly away from you. It works this way even if your father is terrific; all that gets you is even more distance in the generation-by-generation game.

That's it. No matter the local variation, no matter how the parts are passed around, they always work together to generate two separate pieces of a unity: something to be part of, so you know who you have been, and something to stand against, to find out what you could be.

All you parents out there, either now or would-be, that's all you have to remember. It is the only lesson in the plan. Give your children life and standards, and don't deny them their possibilities. They will do the rest.

My father did not have this. His mother filled his universe, and nothing and no one ever came along that was strong enough to shove her back into her proper half. As a result his intelligence was never realized, his social skills never fully developed, his talents left dead before delivery, and his innate creativity diverted to the task of shoring up illusions instead of realizing dreams. He became an artist-in-negative, a master of attacking the very things he craved most. Small wonder he was so very angry with me when I left home at 17, just as he had. He thought I was headed for the same fall. In his own way, blind with pain, all he wanted to do was save me.

Only if anything it is working out the other way.

Tonight I am finally the same age that my father was when I was born, and I must take stock of myself against him. *Not* to put him down, but to honor him. Yes, he has largely wasted his life. That matter of metal again: He was not strong enough to beat the odds against him. But he didn't give me an absence instead of a presence. He didn't give me a vacuum. For that, on this night, with this sleeping boy to help guide, I am very grateful.

What did my father give me? In truth, in the sense that the texture of the canvas underlies every brush stroke in a painting, he gave me everything that I now am.

Here is the litany:

By his faltering he has shown me that to give up, for an artist, is worse than death.

Through his inability to feel he has taught me that nothing is more important than to feel.

Through his fear and lies he has taught me to love bravery and truth.

And through his silence he has shown me that what will save this world — if anything ever will — is to share. ■

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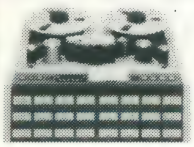

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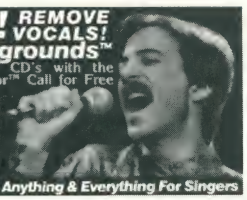

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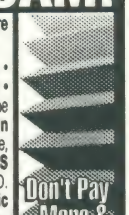

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ad index

KEYBOARDS/SAMPLERS/ SYNTHESIZERS

E-Mu 59
Ensoniq 57,66
Fatar 96
Korg ....Inside Front Cover,1
Kurzweil ....Inside Back Cover
Oberheim 43
Peavey 105
Roland 5
Studio Electronics 126
Yamaha ....Back Cover

SOUNDS

Big Fish Audio 47
East-West Communications 24/25
Ensoniq 120
Eye & I 94
Hollywood Edge 35
Ilio Entertainments 77
Invision 8,114
Loop Soup 98
Northstar 87
Pro-Rec 107
Sound Source Interactive 92/93
Spectrasonics 82

COMPUTER HARDWARE/SOFTWARE

Music Quest 9,42
MusiKeys 95
Musitek 68
Opcode 53
Pan Network 76
PG Music 109,116/117
Soundtrek 46
Steinberg/Jones 121
Sydney Urshan Music 113
Tran Tracks 42
Trycho 85
Twelve Tone Systems 33,119

RECORDING EQUIPMENT/MIXERS/ SOUND REINFORCEMENT

AKG 63
Akai 55
dbx 7
Disc Makers 67
Mackie 10/11,71
Sony 45
Tascam 31

EFFECTS DEVICES/ SIGNAL PROCESSORS

Behringer 81
Digitech 36/37
LT Sound 120
Rane 86
Symetrix 102
Zoom 41

RETAILERS

Bananas at Large 98
Caruso Music 44
Century Music 67
Computers & Music 99
E.U. Wurlitzer 68
Goodman Music 75
Grandma's 54
Guitar Guitar 94
Leigh's Computers 43
MacBeat 76
Musician's Friend 16/17
Nadine's Music 95
New York Music 126
Rhythm City 108
Rich Music 84
Sam Ash 64
Soundware 54
Speir 77
Sweetwater Sound 78
Thoroughbred Music 104
West LA Music 69
Woodwind & Brasswind 70

PUBLICATIONS/INSTRUCTION/ SCHOOLS

American Educational 134/135
Berklee 125
EVS 8
Grove/Rasch School Without Walls 75
Homespun Tapes 133
Musicians Institute 110
Musician's Friend 16/17
NRI Schools ....96/97(Insert)
Oberlin 84
Recording Workshop 70
SAE 128
United States Air Force 83

RECORDINGS

GRP 85

OTHER

Discount Distributors 126
H.E.A.R. 132
Keyboard/Musicator Giveaway 65
Keyboard Back Issues 130
Keyboard Presents Premiere Issue 56
Miller Freeman Books 58,122,127,129
Taxi 136

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creative options

CONNOR FREFF COCHRAN

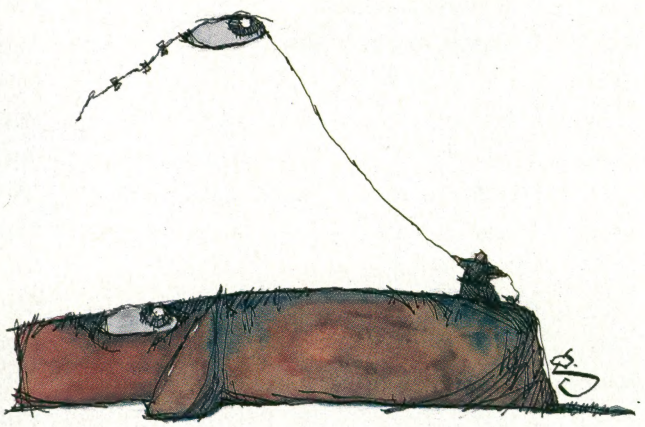
It's a Plan, Stan

Tonight I am finally the same age that my father was when I was born — the father of my body, anyway; our two spirits were cast in similar shape but from different metals. Tonight, also, there is a little boy asleep on the couch behind me, here in this upstairs room with the desert-facing window. He sleeps like a cat, the curve of his back enough to make you believe in spines of gutta percha, not bone. He is eight years old and he isn't mine, not in body nor shape of spirit. But in metal? In that indefinable underlying substance we cannot touch yet always feel, noticing that this person seems hard and that one soft, this one flexible and that one brittle beyond relief . . . well, that is quite another matter. Where metal is concerned, this sleeping puzzle and I share common ground.

It seems the right time to talk about fathers.

I'd like to introduce you to mine. His name is Stanford Lamar Cochran. He was born in Oklahoma in 1914, the only child of a brief, troubled marriage between his 18-year-old mostly-German mother, Nell, and his 30-ish mostly-Irish father, whose name may or may not have been Newton; here the record and Nell's memory disagree. The "troubled" part of their union came from the fact that the marriage seems to have been arranged, at least in part, against Nell's will. By report she didn't like her new husband much and found the physical side of their relationship an obligation, not a joy. The "brief" part comes courtesy the influenza epidemic of 1918, which emptied the world of some twenty million souls before it ran its course, my father's father among them. I have seen just one picture of this tall, slender man, who while he lived was a carpenter, and it seems prophetic, because in it his face is not visible. Just his body. This is exactly what he gave my father: form and absence.

Nell never remarried. She apparently never even dated, or showed any interest in same. Instead my father became her life, and she lavished enough attention on him to drown a much stronger spirit. (Right up and into his pubescence she would do things like dress him in her clothes and parade him before her friends to show how "pretty" he was. He never really had a chance.) When he finally did rebel in his teen years, it was more show than substance. He got in trouble a lot, dropped out of high school, did the pool-hall-and-booze-and-cigarettes thing that went with being a slacker in the Depression-era 1930s, took on odd jobs, and hit the road, eventually becoming a traveling salesman dealing in parts for the oil drilling trade. This was not a period of great stability for him or the country, and while he survived, he did not prosper. Too much anger. Too much knee-jerk lashing out at authority. An insecure man with lots of gung-ho backslap but few real friends or connections. The kind of guy you enjoyed as he approached you and as he left, and that you put up with in between. When WW2 hit he enlisted, like everybody else, and wound up another skinny potato-peeling private in the Army.



This was a potential turning point for him, an opportunity to move his life onto a different track. The war was flipping everything upside down, stirring the social soup, erasing seemingly eternal walls overnight. The Army was all Present Tense. They didn't care who you had been, or what you had done, so long as you could do the right job *now*. That kind of furnace melts away a lot of garbage. It helps people discover who they really are, assuming they actually want to know. And a bit of it did touch my father. On a whim — a dare? another "*I'll* show you" shout? — he took a test for Officer's Candidate School. Academically disinterested he may have been, but stupid he was not. He nailed the test and left potato-peeling behind, buying himself a ticket off the ground and into the sky as a lieutenant with the newly-formed Army Air Corps. They made him a bombardier and eventually shipped him to England, but by then it was late in the war and he never saw any action.

To this day I wonder if that would have made a difference. He had been heated in the fire, and hammered into a new shape, but never tested, never brought into play. Muscles atrophy if not exercised. So does strength of spirit. Perhaps the rest of his personality continued to get in the way — he was always too nettlesome, too unwilling to take orders to make a really good soldier — and it denied him the opportunities he later said he wanted. Perhaps he was afraid, and avoided those opportunities, and now can admit neither. I don't know. Probably never will. He's not telling.

But I do know that in some ways, acing that test was the high point of his life.

After the Army Air Force he went back to the salesman's trade, this time in cement. It is cheap irony to point out that with this decision he became, quite literally, stuck. He got married to Doris Maxine McGraw of Salem, Illinois, former best friend of the fiancée who had "Dear Johned" him during the war. He had a son. Then another. Then yet another. He bought the entire package of 1950s prosperity, as did so many other children of the Depression and WW2, and so what if he couldn't really afford it? So what if it took all the wit and creativity he had left to fudge each month's clients, and orders, and expense accounts in such a way that he could Look Just Like Everybody Else in a socio-economic group he

Continued on page 136 ►

Connor Freff Cochran is happily busy with a new partnership and new projects, including forays into that strange place called Hollywood. If you are interested in more of his explorations into creativity and life, just write c/o Crossing Point, 47 Lafayette Circle, Suite 180, Lafayette, CA 94549, and ask for a free copy of Connor's Creation *newsletter.*

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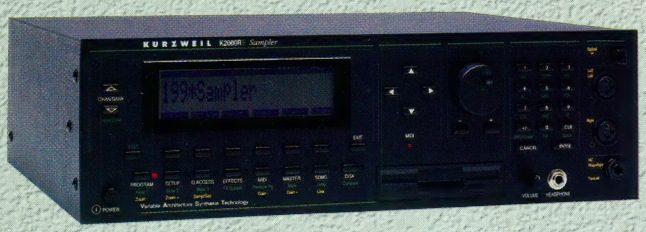

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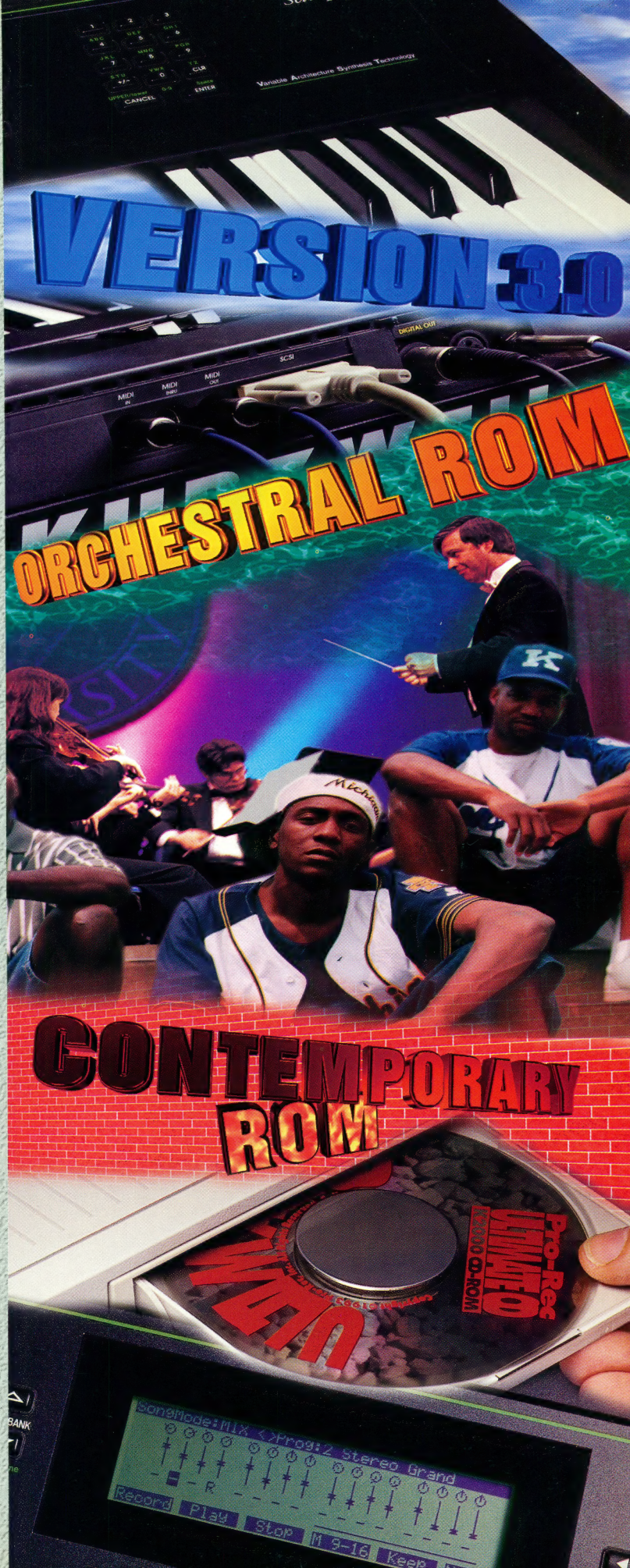

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